10. Network Architecture and Configuration

The Testbed at all four sites is configured into a single DCE cell architecture. The cell services and administration is controlled from the SMC CSS server located at the GSFC DAAC.

10.1 Common Elements and Connectivity

At each Testbed site, the network consists of one or more FDDI segments. The FDDI segment is formed using FDDI concentrators and Ethernet hubs with FDDI uplinks. At GSFC and LaRC, the central FDDI switch/router interconnects the FDDI segments which are either switched or routed. At EDC and NSIDC, the Testbed network consists of a single FDDI segment. At these sites, the remote access servers are connected to one of the Ethernet hubs for dial up access. The Ethernet hubs at each Testbed site are primarily used to support X-terminal and printer connectivity. The network topology and architecture details are described in the site specific sections.

10.1.1 Network Protocols

The Internetworking Subsystem (ISS) provides internetworking services based on protocols and standards corresponding to the lower four layers of the OSI reference model as described below.

Transport Protocols

ECS provides Internet Protocol (IP)-based, connection-oriented and connectionless transport services. The connection-oriented service is implemented using Transmission Control Protocol (TCP), while User Datagram Protocol (UDP) is used for connectionless transport. Based on the requirements such as performance and reliability, the higher layer applications use either TCP or UDP protocols.

The TCP, specified in RFC 793, is a connection-oriented, end-to-end reliable protocol designed to fit into a layered hierarchy of protocols which support multi-network applications. It provides for reliable inter-process communication between pairs of processes in host computers attached to networks within and outside ECS. Because TCP assumes that it may obtain potentially unreliable datagram service from the lower level protocols, it involves additional overhead due to the implementation of the retransmission and acknowledgment processes.

The UDP, specified in RFC 768, provides a procedure for application programs to send messages to other programs with minimal overhead. The protocol is transaction oriented and delivery of data is not guaranteed since there is no acknowledgment process or retransmission mechanism. Therefore, applications requiring ordered and reliable delivery of data would use TCP.

Network Layer Protocols

The network layer provides the functional and procedural means to transparently exchange network data units between transport entities over network connections, both for connection-mode and connectionless-mode communications. It relieves the transport layer from concern of all routing and relay operations associated with network connections.

The IP, specified in RFC 791, is the ECS-supported network protocol. As part of IP support, ICMP (Internet Control Message Protocol) and ARP (Address Resolution Protocol) will also be supported.

Physical/Data link Protocols

Physical and data link protocols describe the procedural and functional means of accessing a particular network topology. For the Testbeds, the datalink/physical protocols are ANSI FDDI and Ethernet. FDDI is a 100 Mbps token-passing network topology, and Ethernet is a 10 Mbps bus topology.

10.1.2 Network Security

Network and transport-layer router filters control the traffic that passes through a given router by controlling access to individual hosts, networks and transport protocol (e.g., TCP) ports.

Although it is possible to implement network security via network and transport-layer filters in ECS routers, all filters have been disabled.

Note: In order to comply with the end user's request for an unrestricted access, the filters have been disabled. A security waiver was obtained from NASA/ESDIS so that ECS can comply with the request.

10.2 Testbed Network at GSFC

The GSFC Pre-Release B Testbed network topology is illustrated in Figure 10.2-1.

Both dual and single attached connections exist on the Testbed. Servers are generally dual attached, i.e., they have Dual Attached Station (DAS) interfaces. Workstations are single attached, i.e., they have Single Attached Station (SAS) interfaces. Hosts that have a dual attached card are also dual homed to two separate FDDI concentrators. Detailed network connectivity and IP addressing information is provided in Section 10.2.1.

External network access is provided via routed FDDI switch/router interfaces to EBnet and the GSFC IsoLAN. Connectivity to the Internet is via the IsoLAN interface of the FDDI switch/router. The switch/router has a peering arrangement with the NSI router on the IsoLAN. Connection to other Testbeds is accomplished via the EBnet router. The Pre-Release B SMC network, which is a single FDDI segment is directly connected to the GSFC FDDI switch/router.

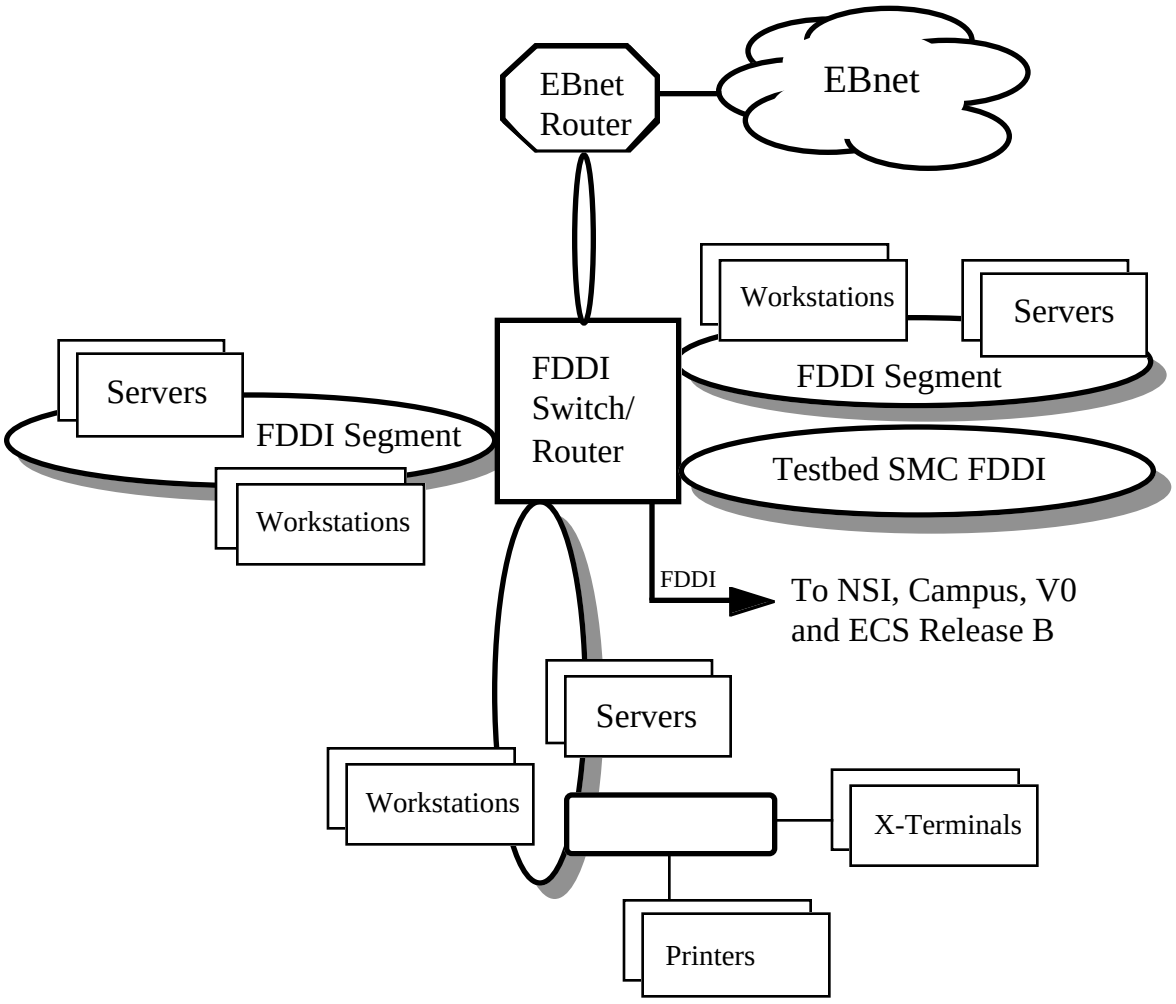


Figure 10.2-1. Network Topology at GSFC

10.2.1. IP Address Assignment and Network Connectivity at GSFC

The GSFC Testbed (production portion) has a Class C address space. All ECS address space is provided by EBnet from Class C address blocks designated by NSI. The address and subnet mask information relevant to the GSFC Testbed is given in Table 10.2.1-1. Figure 10.2.1-1 shows the detailed network connectivity and node address assignments for the Testbed. The SMC network at GSFC shown in Figure 10.2.1-2 is included in this document for information only.

Table 10.2.1-1. GSFC Testbed Network Address Space Information

Class C Network	Subnet Mask	Class C Subnet	Nodes/Network
198.118.192.0	255.255.255.0	n/a	254

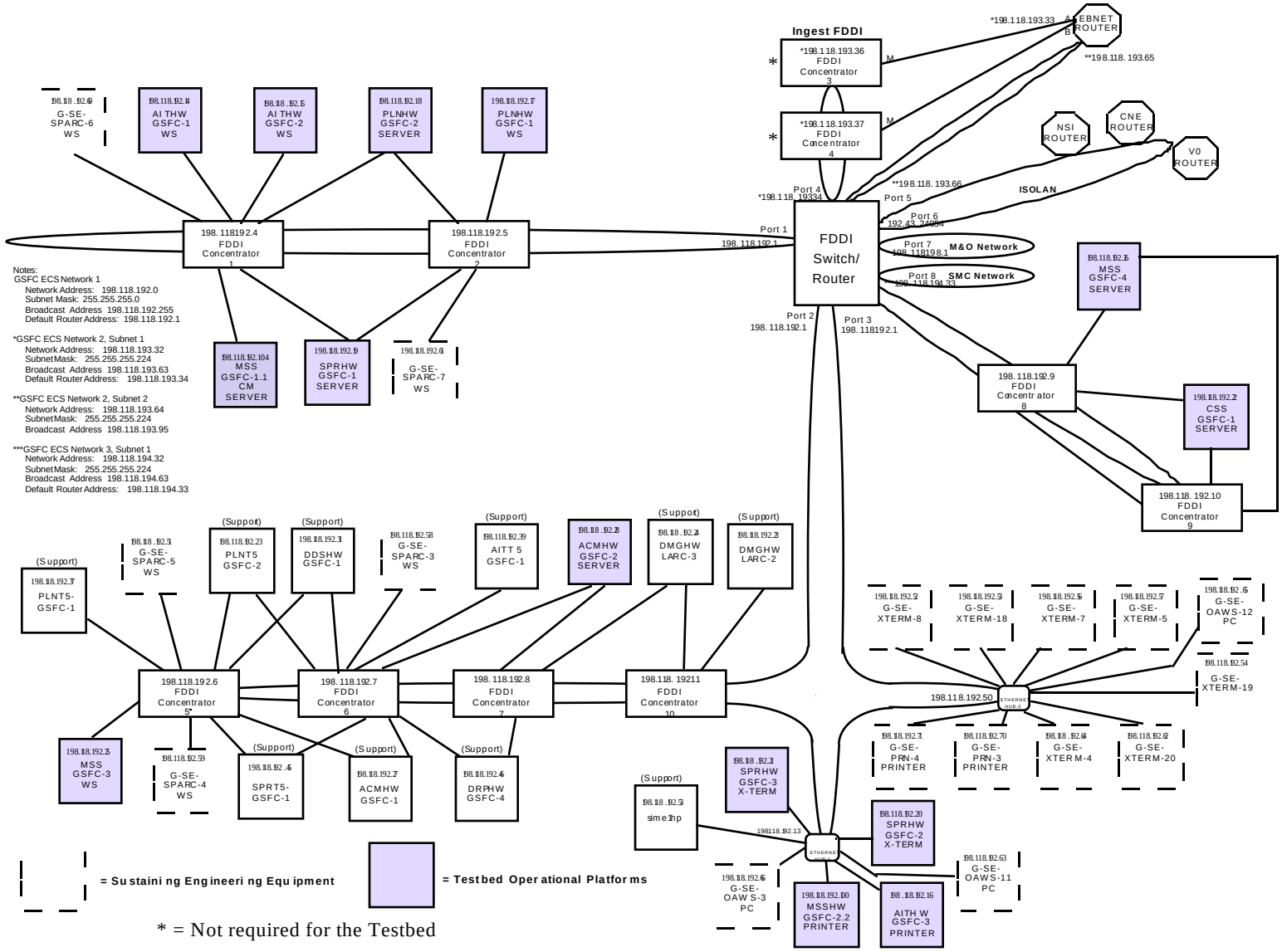
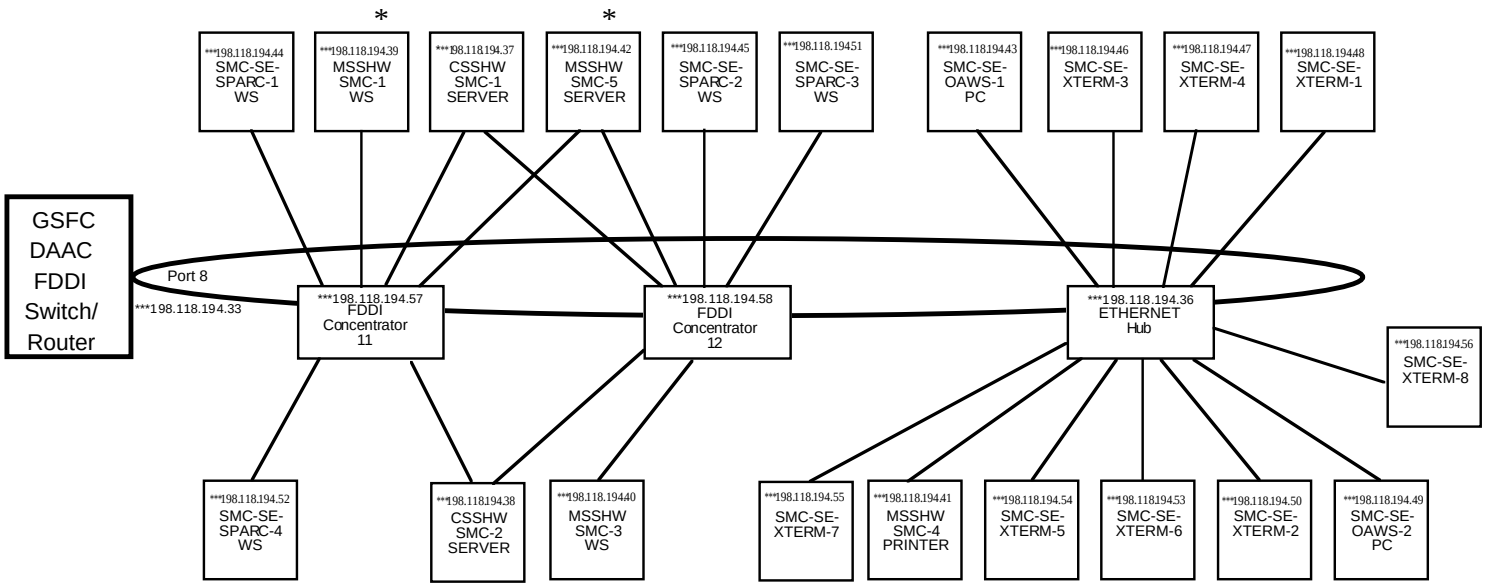


Figure 10.2.1-1. Network Connectivity and Addressing for the Testbed at GSFC



***GSFC ECS Network 3, Subnet 1
Network Address: 198.118.194.32
Subnet Mask: 255.255.255.224
Broadcast Address 198.118.194.63
Default Router Address: 198.118.194.33

* = Not required for the Testbed

Figure 10.2.1-2. Network Connectivity for the Testbed SMC at GSFC

10.2.2 Testbed Routing at GSFC

Routing Information Protocol (RIP) is the protocol used to route IP packets within ECS as well as to/from external networks. The GSFC Testbed and Testbed SMC networks are advertised via RIP to NSI and the GSFC IsoLan. The same networks are also advertised to EBnet. A figure showing detailed route advertisement information is provided in Figure 10.2.2-1

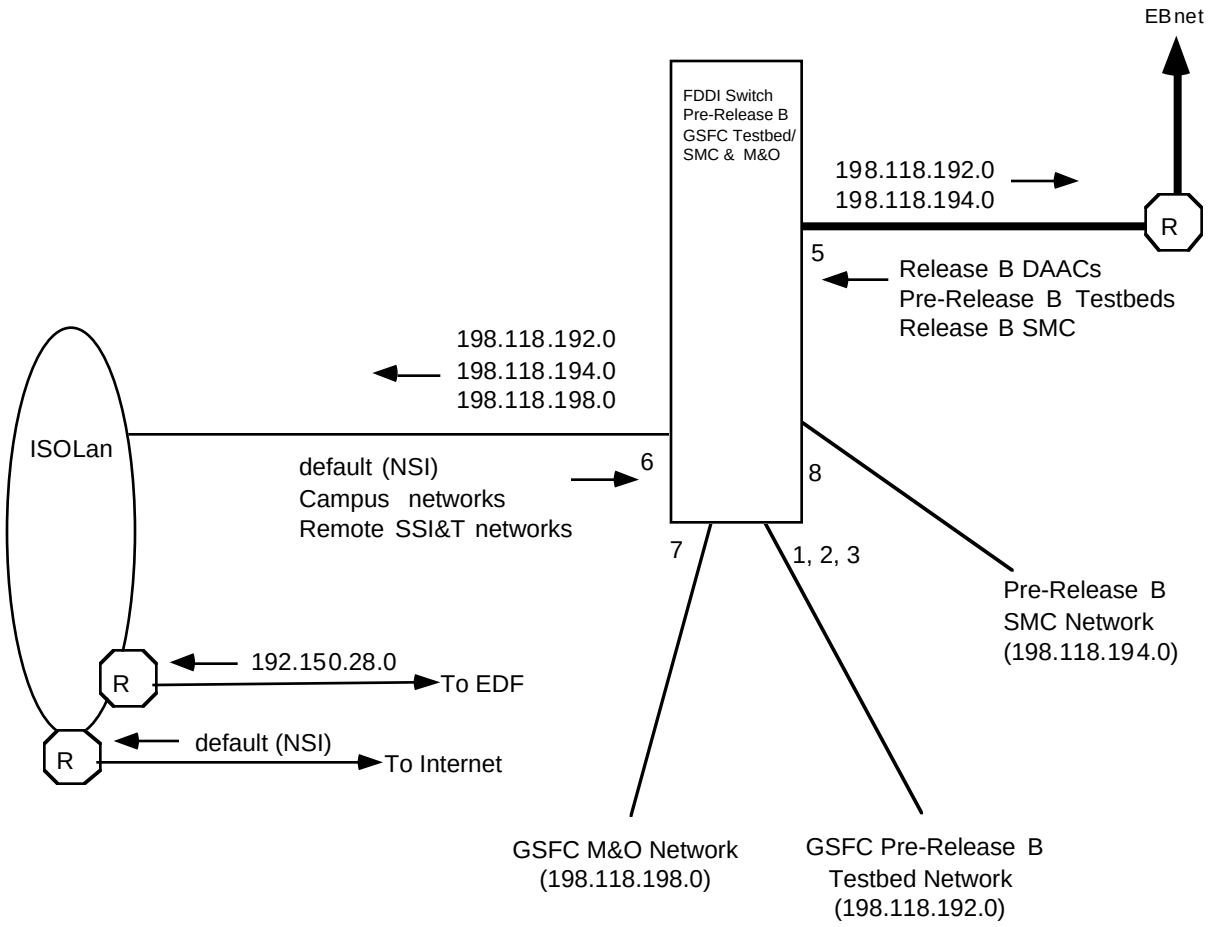


Figure 10.2.2-1. GSFC Testbed Route Advisement

10.2.3 Network Hardware at GSFC

The GSFC Testbed contains three types of COTS hardware: FDDI switch/router, FDDI concentrators, and FDDI-to-Ethernet hubs. As described above, the FDDI segments that form the Testbed network are implemented using FDDI concentrators. The FDDI-to-Ethernet hubs are used to connect printers and X-terminals.

Table 10.2.3-1 shows the COTS network hardware used for the GSFC Testbed. Both the FDDI concentrators and the FDDI-to-Ethernet hubs are pre-configured, self-contained, stackable units. For the purposes of this document, "stackable" refers to devices that are pre-configured with a

specific number of ports, as opposed to devices that contain chassis with multiple slots into which various interface cards are inserted.

The operation and product specific design information of the COTs hardware is fully documented in the vendor provided documentation. They are listed in the Section 2 of this document.

Table 10.2.3-1. GSFC LAN Hardware

Item	Vendor and Model	Capacity	Description
FDDI Concentrator	Bay Networks System 2000 Model 2914-04	12 M Ports plus 1 A/B Port	All-FDDI Stackable Hub with MIC Interfaces
FDDI-to-Ethernet Hub	Cabletron MicroMAC-22E with BRIM-F6 Module	1 A/B FDDI Port and 12 Shared Ethernet Port	Stackable 10baseT HUB to connect Ethernet to FDDI
FDDI Switch/Router	FORE PowerHub 7000	8 DAS FDDI ports on a single chassis	

10.2.4 Points of Contact for GSFC Testbed Network

Table 10.2.4-1. Points of Contact for GSFC Network

Organization	*Point of Contact*	*Phone Number*
EBnet	Comm. Manager	301-286-6141
NSI	NSI Operations Center	1-800-424-9920
GSFC Network	Noell Marrero/Gene Gottchalk	301-286-7871/301-614-5119

10.3 Testbed Network at LaRC

The LaRC Pre-Release B Testbed network topology is illustrated in Figure 10.3-1.

Both dual and single attached connections exist on the Testbed. Servers are generally dual attached, i.e., they have Dual Attached Station (DAS) interfaces. Workstations are single attached, i.e., they have Single Attached Station (SAS) interfaces. Hosts that have a dual attached card are also dual homed to two separate FDDI concentrators. A detailed network connectivity and IP addressing information is provided in Section 10.3.1.

External network access is provided via routed FDDI switch/router interfaces to EBnet and the LaRC IsoLAN. Connectivity to the Internet is via the IsoLAN interface of the FDDI switch/router. The switch/router has a peering arrangement with the NSI router on the IsoLAN. Connection to other Testbeds is accomplished via the EBnet router. The Pre-Release B SMC network, which is a single FDDI segment, is directly connected to the LaRC FDDI switch/router.

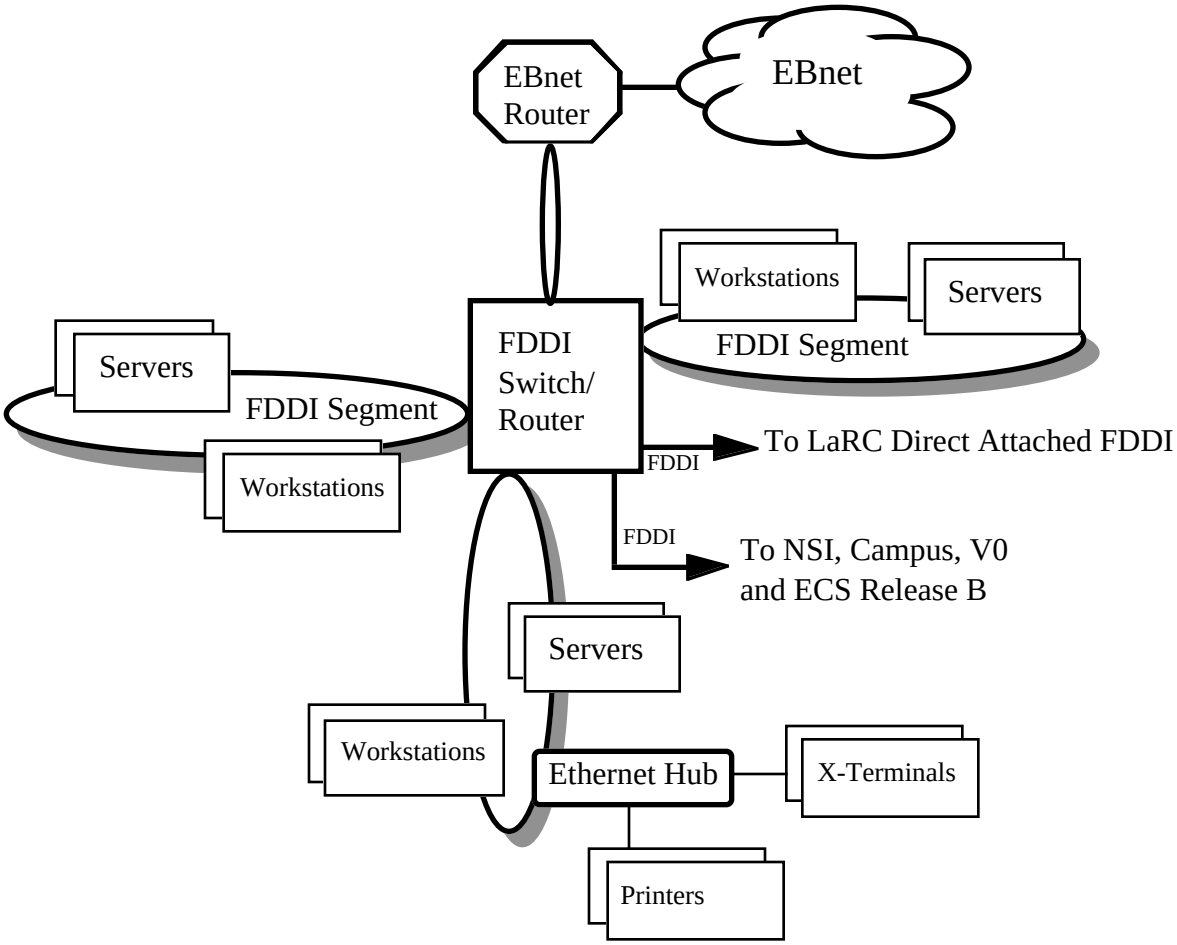


Figure 10.3-1. Network Topology at LaRC

10.3.1 IP Address Assignment and Network Connectivity at LaRC

The LaRC Testbed (production portion) has a Class C address space. All ECS address space is provided by EBnet from Class C address blocks designated by NSI. The address and subnet mask information relevant to the LaRC Testbed is given in Table 10.3.1-1. The Figure 10.3.1-1 shows the detailed network connectivity and node address assignments for the Testbed.

Table 10.3.1-1. LaRC Testbed Network Address Space Information

Class C Network	Subnet Mask	Class C Subnet	Nodes/Network
198.118.192.0	255.255.255.0	n/a	254

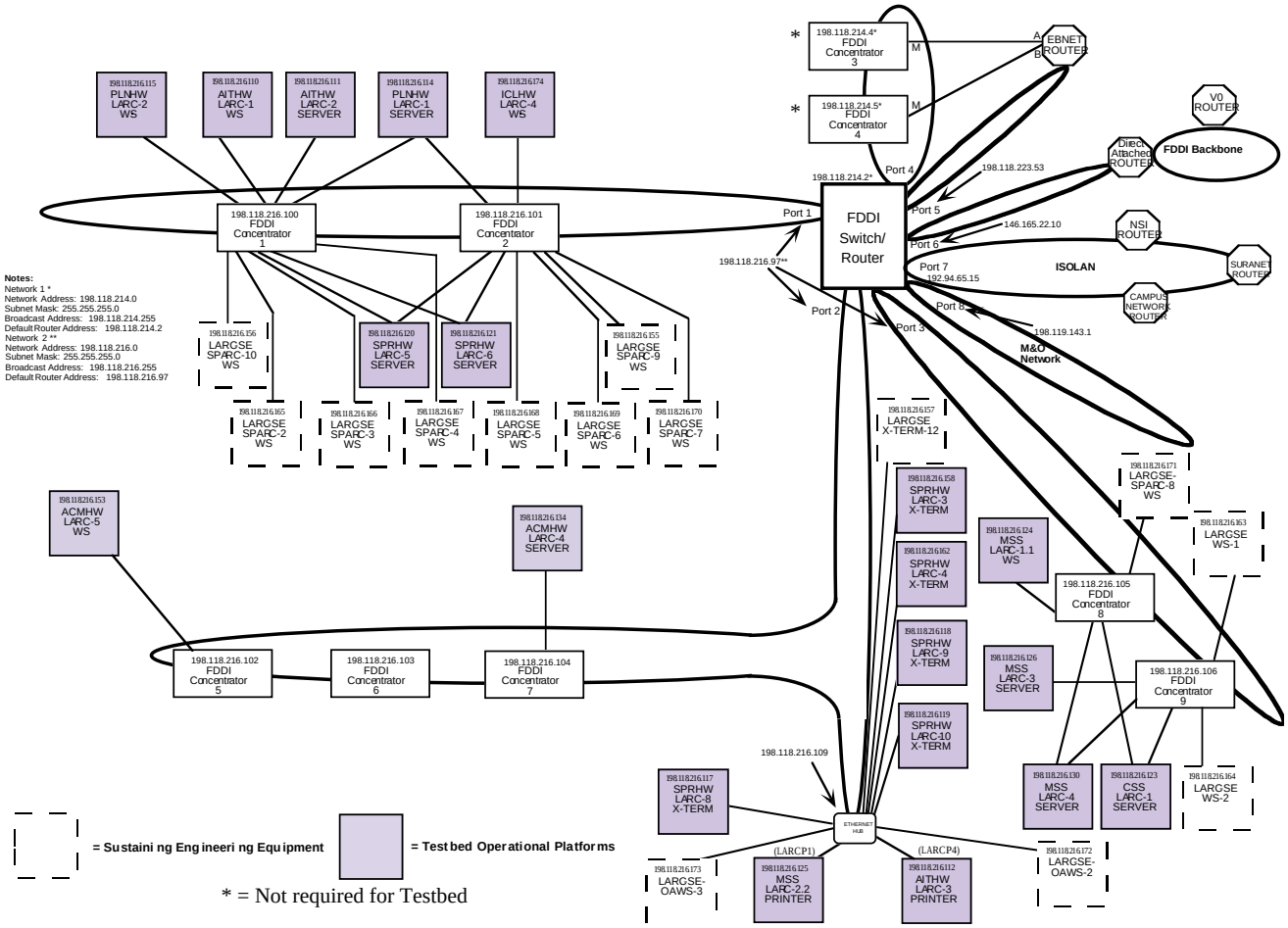


Figure 10.3.1-1. Network Connectivity and Addressing for the Testbed at LaRC

10.3.2 Testbed Routing at LaRC

Routing Information Protocol (RIP) is the protocol used to route IP packets within ECS as well as to/from external networks. The LaRC Testbed network is advertised via RIP to NSI and the LaRC IsoLAN. The same network is also advertised to EBnet. Figure 10.3.2-1 shows detailed route advertisement information for LaRC.

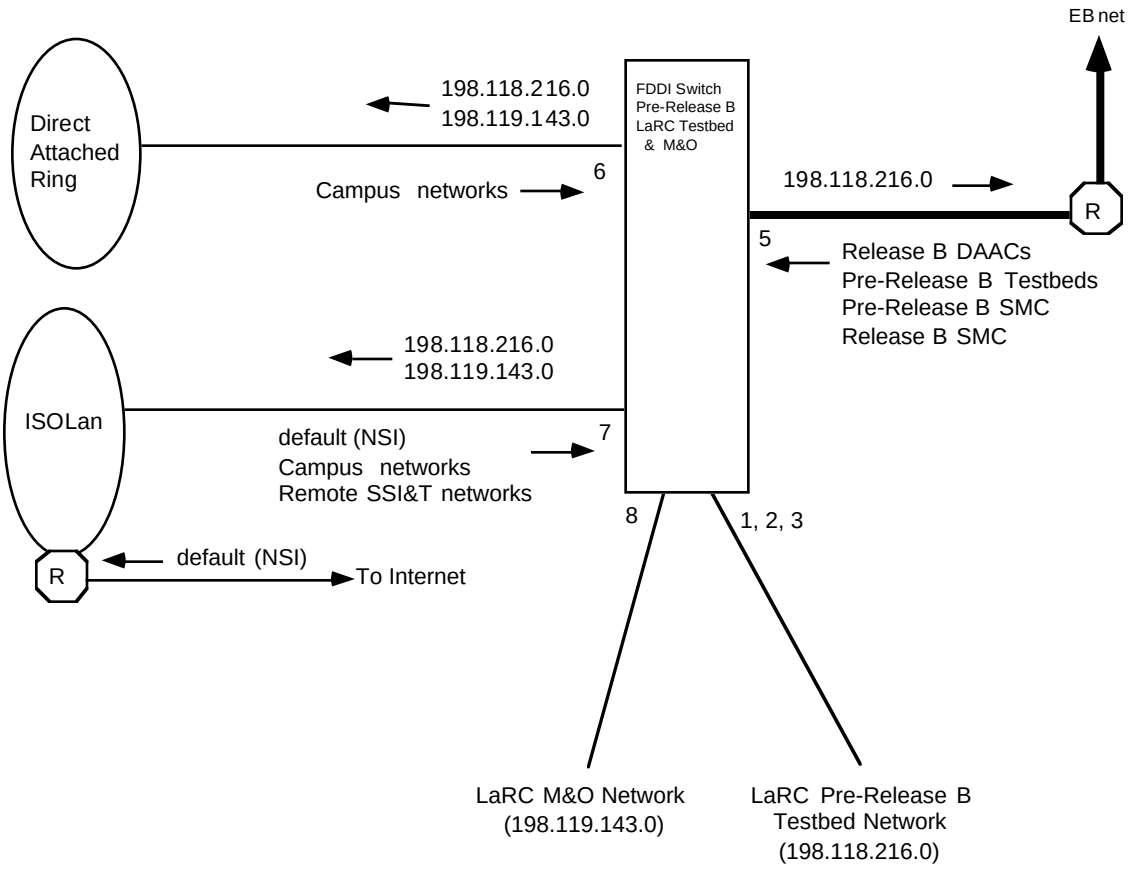


Figure 10.3.2-1. LaRC Testbed Route Advisement

10.3.3 Network Hardware at LaRC

The LaRC Testbed contains four types of COTS hardware: FDDI switch/router, FDDI concentrators, FDDI-to-Ethernet hubs, and remote access with two modems. As described above, the FDDI segments that form the Testbed network are implemented using FDDI concentrators. The FDDI-to-Ethernet hubs are used to connect printers, X-terminals, and PCs.

Table 10.3.3-1 shows COTS network hardware used for the LaRC Testbed. Both the FDDI concentrators and the FDDI-to-Ethernet hubs are pre-configured, self-contained, stackable units. For the purposes of this document, "stackable" refers to devices that are pre-configured with a

specific number of ports, as opposed to devices that contain chassis with multiple slots into which various interface cards are inserted.

The operation and product specific design information of the COTs hardware is fully documented in the vendor provided documentation. They are listed in the Section 2 of this document.

Table 10.3.3-1. LaRC LAN Hardware

Item	Vendor and Model	Capacity	Description
FDDI Concentrator	Bay Networks System 2000 Model 2914-04	12 M Ports plus 1 A/B Port	All-FDDI Stackable Hub with MIC Interfaces
FDDI-to-Ethernet Hub	Cabletron MicroMAC-22E with BRIM-F6 Module	1 A/B FDDI Port and 12 Shared Ethernet Port	Stackable 10baseT HUB to connect Ethernet to FDDI
FDDI Switch/Router	FORE PowerHub 7000	8 DAS FDDI ports on a single chassis	

10.3.4 Points of Contact for the LaRC Testbed Network

Table 10.3.4-1. Points of Contact for LaRC Network

Organization	Point of Contact	Phone Number
EBnet	Comm. Manager	301-286-6141
NSI	NSI Operations Center	1-800-424-9920
LaRC Network	Dave Yeager	757-864-7351

10.4 Testbed Network at EDC

The EDC Pre-Release B Testbed network topology is illustrated in Figure 10.4-1.

The network consists of a single FDDI ring formed using three FDDI concentrators and two Ethernet hubs with FDDI uplinks. Both dual and single attached connections exist on the Testbed. Servers are generally dual attached, i.e., they have Dual Attached Station (DAS) interfaces. Workstations are single attached, i.e., they have Single Attached Station (SAS) interfaces on the FDDI network. Hosts that have a dual attached card are also dual homed to two separate FDDI concentrators. A detailed network connectivity and IP addressing information is provided in Section 10.4.1.

External network access is provided via the EBnet and ECS routers. In addition, a remote access server provides dial-up access. Connectivity to the Internet is via the ECS router which has a peering arrangement with the NSI router on the EDC exchange LAN. The ECS router serves both the Testbed as well as the Release B network. Connection to other Testbeds and the Pre-Release B Testbed SMC at GSFC is accomplished via the EBnet router. EDC's Testbed network is one of the two Testbed networks that has a direct connection (the EBnet router connects to an Ethernet hub instead of a Testbed switch/router) to the EBnet "cloud". This setup was chosen because of the simple nature of the network requirements and the fact that there was no Release A network at EDC.

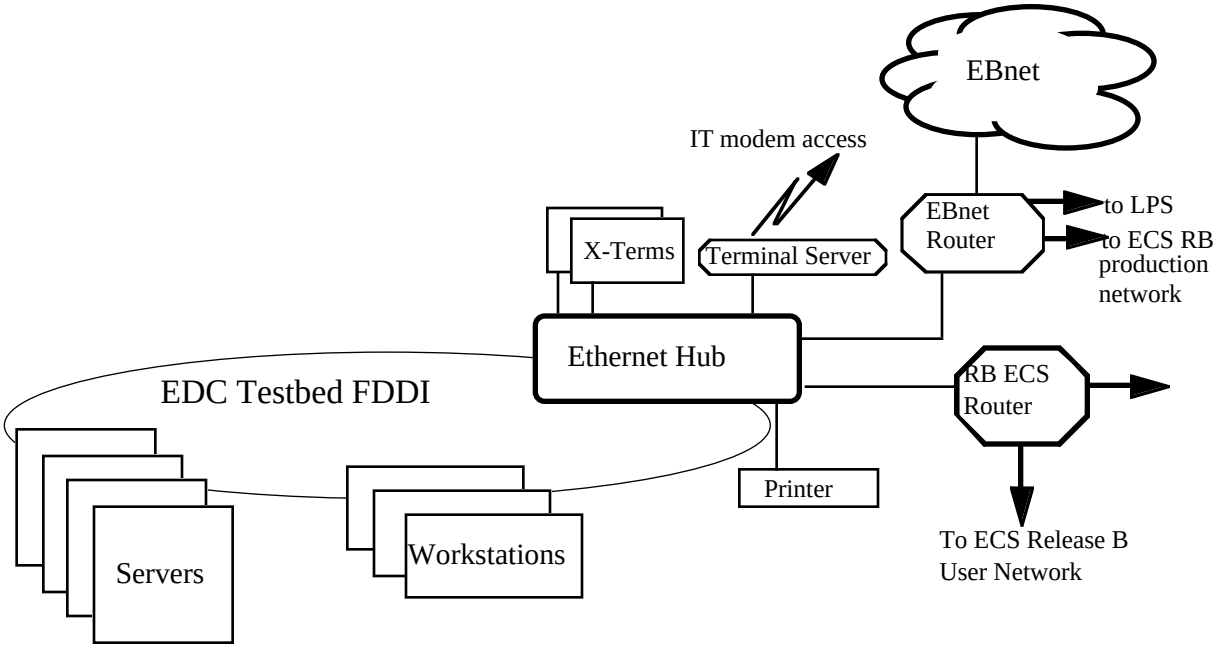


Figure 10.4-1. Network Topology at EDC

10.4.1 IP Address Assignment and Network Connectivity at EDC

The EDC Testbed (production portion) has a Class C address space. All ECS address space is provided by EBnet from Class C address blocks designated by NSI. The address and subnet mask information relevant to the EDC Testbed is given in Table 10.4.1-1. As shown in the table, up to 62 nodes can be assigned from the address space provided (that is, 198.118.224.65 through 198.118.224.126). Although a subnetted Class C address is assigned to the EDC Testbed, the full Class C address is advertised by the ECS router as discussed in Section 10.4.2. The Figure 10.4.1-1 shows the detailed network connectivity. Tables 10.4.1-2 and 10.4.1-3 provide detailed node address assignments for the EDC Testbed.

Table 10.4.1-1. EDC Testbed Network Address Space Information

Class C Network	Subnet Mask	Class C Subnet	Nodes/Network
198.118.224.0	255.255.255.198	198.118.224.64	62

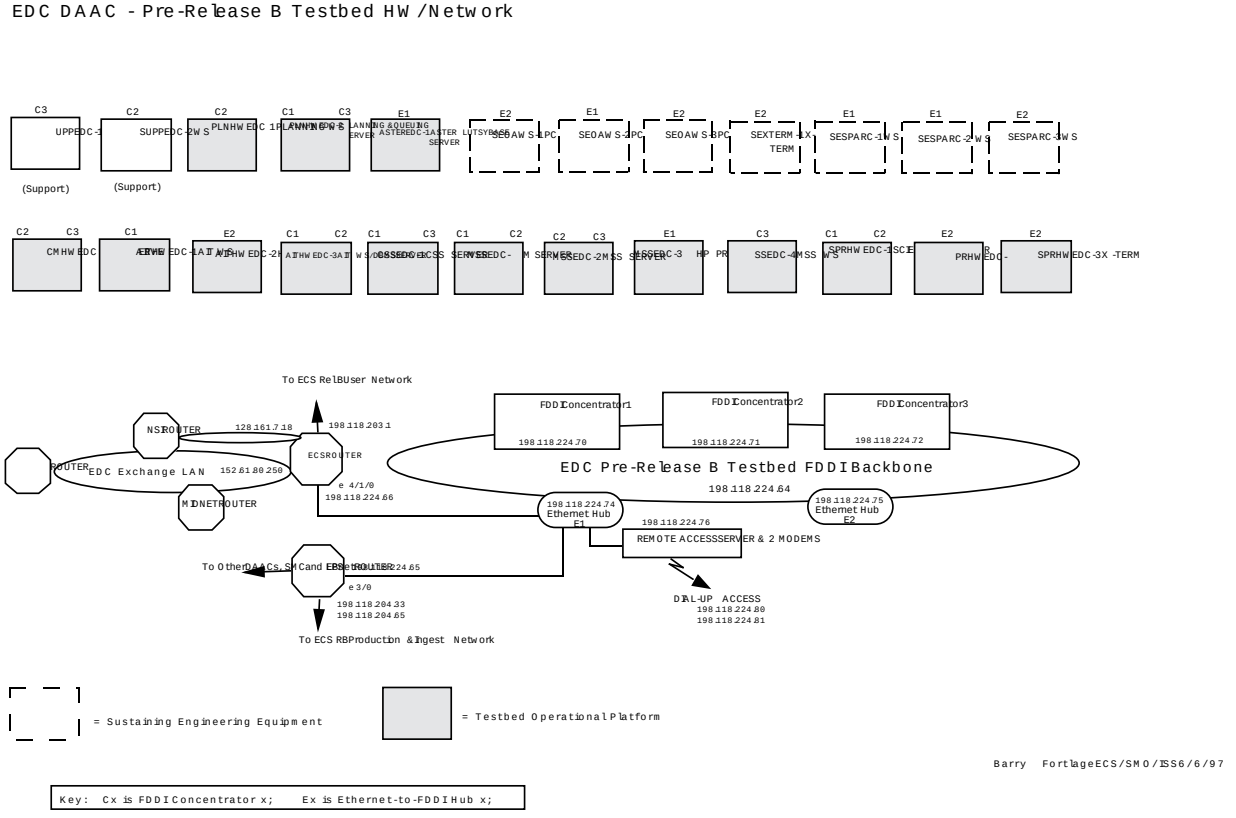


Figure 10.4.1-1. Network Connectivity at EDC

Table 10.4.1-2. Network Address for the Host at EDC

EDC DAAC
Pre-Release B Testbed
IP Address Assignment
(Network Hardware)

DAAC Network Hardware **Updated: 4/9/97**

Hardware Descriptor	Designator (diagram)	Port	Host/Device Connection	IP Address	Network Address	Network Mask	Broadcast Address	Default Route	Notes
FDDI Concentrator	C1	mgmt	C2/C3/E1/E2	198.118.224.70	198.118.224.64	255.255.255.192	198.118.224.127	198.118.224.66	
FDDI Concentrator	C2	mgmt	C1/C3/E1/E2	198.118.224.71	198.118.224.64	255.255.255.192	198.118.224.127	198.118.224.66	
FDDI Concentrator	C3	mgmt	C1/C2/E1/E2	198.118.224.72	198.118.224.64	255.255.255.192	198.118.224.127	198.118.224.66	
Ethernet Hub	E1	mgmt	C1/C2/C3/E2/ECS Router/EBnet Router	198.118.224.74	198.118.224.64	255.255.255.192	198.118.224.127	198.118.224.66	
Ethernet Hub	E2	mgmt	C1/C2/C3/E1	198.118.224.75	198.118.224.64	255.255.255.192	198.118.224.127	198.118.224.66	
ECS Router	ECS Router	fddi 0/0/0	EDC Exchange LAN	152.61.80.250	152.61.80.0	255.255.252.0	152.61.83.255	n/a	Assigned by EDC
		fddi 0/1/0	NSI Router	128.161.7.18	128.161.7.16	255.255.255.240	128.161.7.31	n/a	Assigned by NSI
		fddi 1/0/0	Rel B User FDDI	198.118.203.1	198.118.203.0	255.255.255.0	198.118.203.255	n/a	
		fddi 1/1/0	Rel B Prod. FDDI	198.118.202.2	198.118.202.0	255.255.255.0	198.118.202.255	n/a	
		fddi 4/0/0	M&O Network	192.102.216.1	192.102.216.0	255.255.255.0	192.102.216.255	n/a	Assigned by EDC
		e 4/1/0	Pre-Release B Testbed	198.118.224.66	198.118.224.64	255.255.255.192	198.118.224.127	n/a	Assigned by NASCOM
EBnet Router	EBnet Router	fddi 0/0	Rel B FDDI SW/Router	198.118.204.33	198.118.204.32	255.255.255.224	198.118.204.63	n/a	Assigned by NASCOM
		fddi 1/0	Rel B Ingest FDDI	198.118.204.65	198.118.204.64	255.255.255.224	198.118.204.95	n/a	
		e 3/0	Pre-Release B Testbed	198.118.224.65	198.118.224.64	255.255.255.192	198.118.224.127	n/a	Assigned by NASCOM
Remote Access Server	Access Server	e 0	E1	198.118.224.76	198.118.224.64	255.255.255.192	198.118.224.127	n/a	
		1	modem #1	198.118.224.80	198.118.224.64	255.255.255.192	198.118.224.127	n/a	User IP Address Allocation #1
		2	modem #2	198.118.224.81	198.118.224.64	255.255.255.192	198.118.224.127	n/a	User IP Address Allocation #2

Table 10.4.1-3. Network Address for the Network Products at EDC

Available in hardcopy only.

10.4.2 Testbed Routing at EDC

Routing Information Protocol (RIP) is the protocol used to route IP packets within ECS as well as to/from external networks. The EDC Testbed network address (the full Class C) is advertised via RIP to NSI and the EDC Exchange LAN. The full Class C address is advertised because RIP does not support selective Class C subnet advertisements. Figure 10.4.2-1 shows detailed route advertisement information.

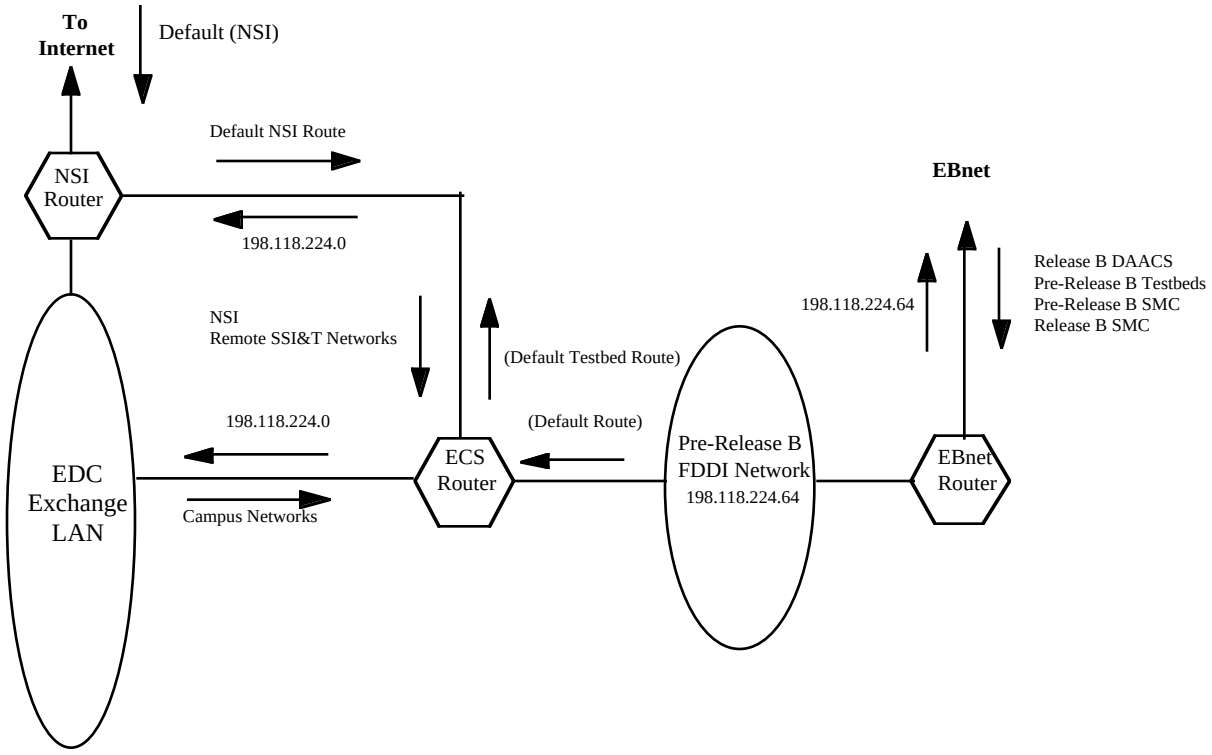


Figure 10.4.2-1. EDC Testbed Route Advisement

10.4.3 Network Hardware at EDC

The EDC Testbed contains three types of COTS hardware: FDDI concentrators, FDDI-to-Ethernet hubs, and a remote access server with two modems. As described above, the FDDI ring that forms the Testbed network is implemented via FDDI concentrators. The FDDI-to-Ethernet hubs are used to connect printers, X-terminals, PCs, routers and a remote access server.

Table 10.4.3-1 shows COTS network hardware used for the EDC Testbed. Both the FDDI concentrators and the FDDI-to-Ethernet hubs are pre-configured, self-contained, stackable units. For the purposes of this document, "stackable" refers to devices that are pre-configured with a specific number of ports, as opposed to devices that contain chassis with multiple slots into which various interface cards are inserted.

The operation and product specific design information of the COTs hardware is fully documented in the vendor provided documentation. They are listed in the Section 2 of this document.

Table 10.4.3-1. EDC LAN Hardware

Item	Vendor and Model	Capacity	Description
FDDI Concentrator	Bay Networks System 2000 Model 2914-04	12 M Ports plus 1 A/B Port	All-FDDI Stackable Hub with MIC Interfaces
FDDI-to-Ethernet Hub	Cabletron MicroMAC-22E with BRIM-F6 Module	1 A/B FDDI Port and 12 Shared Ethernet Port	Stackable 10baseT HUB to connect Ethernet to FDDI
Remote Access Server	Cisco 2509	1 Ethernet port and 8 asynchronous ports	Remote access server
Modems	Hayes OPTIMA 288	N/A	V.34, 28.8 kb/s modem
Router (shared with Release B Network)	Cisco 7507	N/A	Multi-protocol router

10.4.4 Points of Contact for the EDC Network

Table 10.4.4-1. Points of Contact for EDC Network

Organization	Point of Contact	Phone Number
EBnet	Comm. Manager	301-286-6141
NSI	NSI Operations Center	1-800-424-9920
EDC Network	Terry Bobbie	605-594-6807

10.5 Testbed Network at NSIDC

The NSIDC Pre-Release B Testbed network topology is illustrated in Figure 10.5-1.

The network consists of a single FDDI ring formed using three FDDI concentrators and two Ethernet hubs with FDDI uplinks. Both dual and single attached connections exist on the Testbed. Servers are generally dual attached, i.e., they have Dual Attached Station (DAS) interfaces. Workstations are single attached, i.e., they have Single Attached Station (SAS) interfaces on the FDDI network. Hosts that have a dual attached card are also dual homed to two separate FDDI concentrators. A detailed network connectivity and IP addressing information is provided in Section 10.5.1.

External network access is provided via the EBnet and ECS routers. In addition, a remote access server provides dial-up access. Connectivity to the Internet is via the ECS router which has a peering arrangement with the NSI router on the NSIDC exchange LAN. The ECS router serves both the Testbed as well as the Release B network. Connection to other Testbeds and the Pre-Release B Testbed SMC at GSFC is accomplished via the EBnet router. NSIDC's Testbed network is one of the two Testbed networks that has a direct connection (the EBnet router connects

to an Ethernet hub instead of a Testbed switch/router) to the EBnet "cloud". This setup was chosen because of the simple nature of the network requirements.

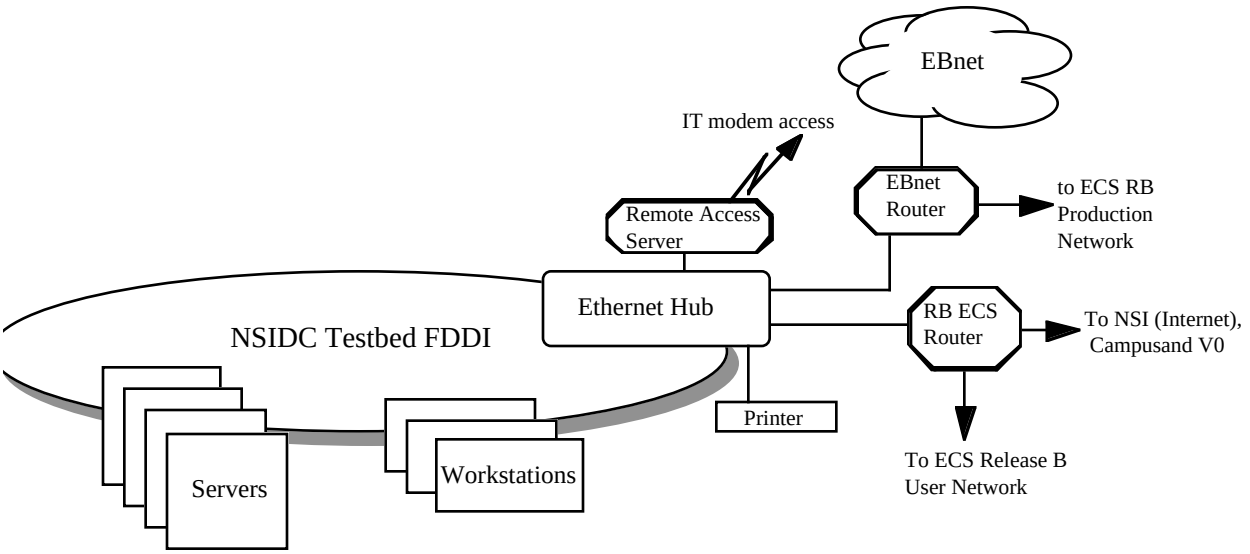


Figure 10.5-1. Network Topology at NSIDC

10.5.1 IP Address Assignment and Network Connectivity at NSIDC

The NSIDC Testbed (production portion) has a Class C address space. All ECS address space is provided by EBnet from Class C address blocks designated by NSI. The address and subnet mask information relevant to the NSIDC Testbed is given in Table 10.5.1-1. As shown in the table, up to 30 nodes can be assigned from the address space provided (that is, 198.118.225.33 through 198.118.225.62). Although a subnetted Class C address is assigned to the NSIDC Testbed, the full Class C address is advertised by the ECS router as discussed in Section 10.5.2. The figure 10.5.1-1 shows the detailed network connectivity. Tables 10.5.1-2 and 10.5.1-3 provide detailed node address assignments for the NSIDC Testbed.

Table 10.5.1-1 NSIDC Testbed Network Address Space Information

Class C Network	Subnet Mask	Class C Subnet	Nodes/Network
198.118.225.0	255.255.255.224	198.118.225.32	30

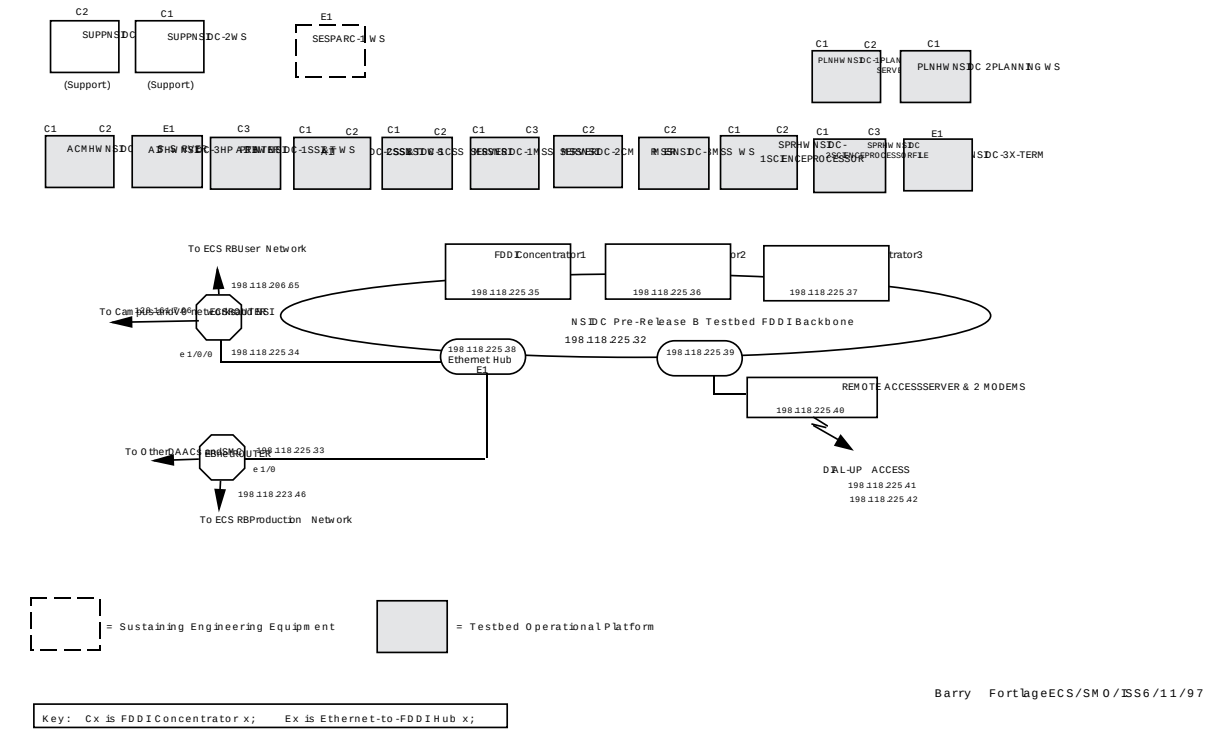


Figure 10.5.1-1. Network Connectivity at NSIDC

Table 10.5.1-2. Network Address for the Host at NSIDC

Available in hardcopy only.

Table 10.5.1-3. Network Address for the Network Products at NSIDC

Available in hardcopy only.

10.5.2 Testbed Routing at NSIDC

Routing Information Protocol (RIP) is the protocol used to route IP packets within ECS as well as to/from external networks. The NSIDC Testbed network address (the full Class C) is advertised via RIP to NSI and the NSIDC Exchange LAN. The full Class C address is advertised because RIP does not support selective Class C subnet advertisements. Figure 10.5.2-1 shows detailed route advertisement information.

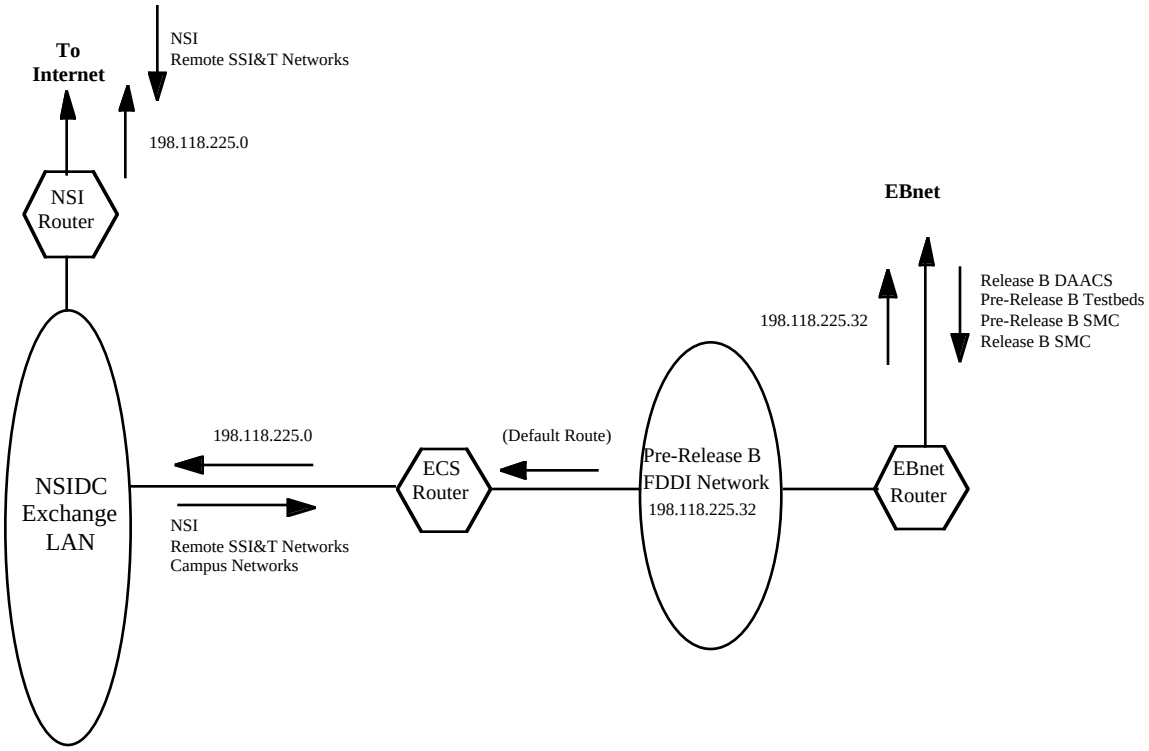


Figure 10.5.2-1. NSIDC Testbed Route Advisement

10.5.3 Network Hardware at NSIDC

The NSIDC Testbed contains three types of COTS hardware: FDDI concentrators, FDDI-to-Ethernet hubs, and a remote access server with two modems. As described above, the FDDI ring that forms the Testbed network is implemented via FDDI concentrators. The FDDI-to-Ethernet hubs are used to connect printers, X-terminals, PCs, routers and a remote access server.

Table 10.5.3-1 shows COTS network hardware used for the NSIDC Testbed. Both the FDDI concentrators and the FDDI-to-Ethernet hubs are pre-configured, self-contained, stackable units. For the purposes of this document, "stackable" refers to devices that are pre-configured with a specific number of ports, as opposed to devices that contain chassis with multiple slots into which various interface cards are inserted.

The operation and product specific design information of the COTs hardware is fully documented in the vendor provided documentation and they are listed in the Section 2 of this document.

Table 10.5.3-1. NSIDC LAN Hardware

Item	Vendor and Model	Capacity	Description
FDDI Concentrator	Bay Networks System 2000 Model 2914-04	12 M Ports plus 1 A/B Port	All-FDDI Stackable Hub with MIC Interfaces
FDDI-to-Ethernet Hub	Cabletron MicroMAC-22E with BRIM-F6 Module	1 A/B FDDI Port and 12 Shared Ethernet Port	Stackable 10baseT HUB to connect Ethernet to FDDI
Remote Access Server	Cisco 2509	1 Ethernet port and 8 asynchronous ports	Remote access server
Modems	Hayes OPTIMA 288	N/A	V.34, 28.8 kb/s modem
Router (shared with Release B Network)	Cisco 7507	N/A	Multi-protocol router

10.5.4 Points of Contact for the NSIDC Network

Table 10.5.4-1 Points of Contact for NSIDC Network

Organization	Point of Contact	Phone Number
EBnet	Comm. Manager	301-286-6141
NSI	NSI Operations Center	1-800-424-9920
NSIDC Network	Graham Mountain	303-492-5144

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11. Hardware Design and Configuration

The Testbed hardware is installed and configured at four DAAC sites, GSFC, LaRC, EDC, and NSIDC. The following sections provide design information on Testbed functional allocation to the hardware, the identification and quantity of hardware items, the hardware configuration, and the software mapping on to the hardware platforms for each site.

11.1 Subsystems, Hardware Identification, and Functions

The Testbed consists of six (6) subsystems based on its physical structure:

5. Processing Subsystem (DPS)
6. Planning Subsystem (PLS)
7. Management Subsystem (MSS)
8. Communication Subsystem CSS)
9. Infrastructure
10. Internetworking Subsystem (ISS)

The hardware for the Testbed is comprised of combination of custom configuration of COTS items or “as is” configuration of COTS equipments. This equipment includes processors, servers, work stations, X-Terminals, mass storage devices (including disk arrays), RAID disks and tape drives, printers, and communications components.

Table 11.1-1 below lists the Testbed’s subsystems which are common to each Testbed. It also lists their HWCI structure, major item identifications within that HWCI, and their intended functions. The Sections 11.2 to 11.5 describe, in detail, the specific hardware configurations for each Testbed site.

Table 11.1-1. Hardware Subsystems and Functions (1 of 3)

Subsystem	Hardware CI	Hardware Item	Function
1. Processing Subsystem (DPS)	SPRHW CI	Science Processor (p/o DPS-SPRHW CI)	PGE Execution Management, Resource Management, Data Preprocessing and Management, Stage and Destage science data products, run SSIT tools(e.g. HDF comparison, PCF checker), execute Science software, provide Processing support (Profiling)
		Science Processing disks (p/o DPS-SPRHW CI)	persistent storage for Science Processor
		Virtual Data Server archive (IMF archive - p/o DPS-SPRHW CI)	persistent large storage of the various data for SSI & T and for push transactions

Table 11.1-1. Hardware Subsystems and Functions (2 of 3)

Subsystem	Hardware CI	Hardware Item	Function
		Tape stacker (p/o DPS-SPRHW CI)	persistent long term storage of the various data for data distribution (push and pull)
		Tape drive (p/o DPS-SPRHW CI)	persistent long term storage of the various data for data distribution (push and pull)
		X- Terminal (p/o DPS-SPRHW CI)	Operational Support
	AITHW CI	Algorithm Integration & Test workstations-AIT WS (p/o of DPS- AITHW CI	SSIT Manager GUI, PGE Registration GUI, QA Monitor, EosView, SDP Toolkit, SSI&T custom Tools
		SSI&T Printer (p/o of DPS-AITHW CI	Hard copy
Planning Subsystem (PLS)	PLNHW CI	Planning Server (p/o of PLNHW CI)	run Planning Workbench Application, Resource Editor, Production Request Editor, Subscription Manager, Data Manager, Execution Manager, Resource Manager, QA Monitor, EosView, SDP Toolkit
		Planning disks (p/o of PLNHW CI)	persistent storage for Science Processor
		Planning Work Stations (p/o of PLNHW CI)	Run Planning Workbench Application, Production Request Editor, Resource Editor, Subscription Manager, QA Monitor, EosView, SDP Toolkit
3. Management Subsystem MSS	MHCI	MSS Server (p/o MSS- MHCI)	Host MSS software and run GUI Support Tools, Office Tools, Custom Compilers, Development Environment, ClearCase Client (point to krypton), HP Open View (HPOV), Pure Coverage, Perl5, DCE Time Server, Sybase SQL Server, Sybase Replication Server, ESSM (Enterprise SQL Server Manager)
		MSS Printer (p/o MSS- MHCI)	Hardcopy
		MSS WS (p/o MHCI)	run office Tools, DDTS, ClearCase View Server
		Shared RAID (p/o MSS-MHCI)	persistent storage for CSS/ MSS servers
		CM Server	provide security services, ClearCase VOB Server, IQ Report Writer

Table 11.1-1. Hardware Subsystems and Functions (3 of 3)

Subsystem	Hardware CI	Hardware Item	Function
		CM Staging Disks	Connected to MSS CM server and provides staging disk for CM builds
4. Communication Subsystem (CSS)	DCHI CI	CSS Server (p/o of DCHI HWCI)	provide Security, DCE Replicate Directory, Security and Time Servers
5. Infrastructure	N/A	NFS (Network File System) Server (uses Access Control & Management hardware ACMHW)	automatically mounts and allows its client to access remote directory and file systems across homogenous and heterogeneous platforms, works as DNS Master Mail Server for DAAC(GSFC**)**
		NFS disk (uses Access Control & Management-ACMHW)	persistent storage for NFS server
6. Internetworking Subsystem (ISS)	INCI	FDDI switch/router (p/o of INCI)	Operates on the network OSI layer 3 and supports multiple network based on its routing protocol table
		FDDI concentrator (p/o of INCI)	provides capability to interface with multiple FDDI stations. A “Multiplexer” system through which single-attached FDDI devices connected to the dual counter rotating ring
		FDDI to Ethernet Hub	Provides Connection to Printers and X-Terminals
		Communication cabinet (p/o of INCI)	House communication equipment
		FDDI cables (p/o of INCI)	Optical signal carrier, a physical media that supports FDDI connectivity
		Ethernet cables (p/o of INCI)	Electrical signal carrier, a physical media that supports Ethernet connectivity
		Alantec Power Hub (p/o of INCI)	Provides power to network components

11.1.1 Severs, Work Stations, Peripherals, and Communication Equipments

The design information of the severs, processors, mass storage devices(i.e., disks, RAID disks, tape drives, work stations, X-Terminals, various subsystems’ peripherals (e.g., printers), and communication equipment are provided in their respective vendors’ manuals. The specific hardware configuration of each item is provided in Sections 11.2 to 11.5 of this document, i.e., DAAC site specific sections.

11.1.2 RAID Disks

The basic idea of redundant arrays of inexpensive disks (RAID) is to combine multiple small, inexpensive disk drives into an array of disk drives which yields performance exceeding that of a single large expensive drive (SLED). This array of drives appears to the computer/host as a single logical storage unit or drive. The Testbeds make extensive use of RAID technology. For the PreRelease B Testbeds, the disk arrays are made fault-tolerant by redundantly storing the information by utilizing array architecture RAID-5 (sometimes called a rotating parity array). The RAID-5 provides for automatic data recovery against all single bit errors. Fundamental to RAID is "striping", a method of concatenating multiple drives into one logical storage unit. Striping involves partitioning each drive's storage space into stripes. These stripes are then interleaved round-robin, so that the combined space is composed of stripes from each drive. Partitioning of RAID disks for each Testbed, at the specific DAAC site, is provided in their respective hardware sections.

In RAID-5, since there is no dedicated parity drive, all drives contain data and read operations which can be overlapped on every drive in the array. Write operations will typically access a single data drive, plus the parity drive for that record. Since different records store their parity on different drives, write operations can be overlapped. In RAID-5, parity information is stored, rather than a complete redundant copy of all data. The result is that any number of drives can be combined into a RAID-5 array, with the effective storage capacity of only one drive sacrificed to store the parity information. When data is written to a RAID-5 array, a new updated parity is written back. However, at least three, (and more typically five or more) drives are recommended for RAID-5 arrays.

11.1.3 Network File System (NFS- Infrastructure)

Network File System (NFS) is a file system that automatically mounts remote directory and file systems across homogenous and heterogeneous systems. NFS consists of client and server systems. An NFS server can export local directories for remote NFS clients(i.e., Testbed hosts/ servers) to use. NFS runs over IP using TCP as the network transport service.

The Planning and Data Processing servers access the science processor directories mounted by an NFS server for control of the data required for PGE execution.

11.1.4 DNS Servers

Following table provides domain name for each of the Testbed sites and identifies the master (primary) and slave (secondary) DNS servers at those sites.

Table 11.1.4-1 Testbed DNS Servers

Testbed Site	Domain Name	Master DNS server	Slave DNS server
GSFC DAAC	.gsfc.ecs.nasa.gov	ACMHW-GSFC-2 (acmg2sgi)	CSS-GSFC-1 (cssn1hp)
LaRC DAAC	.larc.ecs.nasa.gov	ACMHW-LARC-4 (acml4sgi)	CSS-LARC-1 (cssl1hp)
EDC DAAC	.edc.ecs.nasa.gov	ACMHW-EDC-3 (acme3sgi)	CSS-EDC-1 (csse1hp)
NSIDC DAAC	.nsidc.ecs.nasa.gov	ACMHW-NSIDC-1 (acmn1sgi)	CSS-NSIDC-1 (cssn1sgi)

11.1.5 SMC hardware

The SMC at GSFC contains CSS hardware which provides the DCE master cell functionality. It provides for management of directory and naming services for the Testbed.

11.1.6 Software COTS Category

The scope of the Testbed is significantly smaller than that of the original Release A. In the interest of schedule, extraneous COTS software has NOT been removed(i.e., COTS not needed by the Testbed functionality) from those site configurations which have already been configured (GSFC and LaRC). However, only the COTS required by the Testbed is part of the official delivery. This software includes the following items:

- Operating systems and libraries
- DCE clients and libraries; for Distributed Computing Environment
- OODCE libraries
- SNMP agent
- Sybase clients and servers
- X11
- Motif
- Networker Client
- TCPWrapper, Tripwire; for providing required security
- SSI&T compilers: Platform specific FORTRAN F77, F90, NAG F90
- RogueWave libraries
- NCSA HDF; National Computing for Super computing Architecture Hierarchical Data Format
- Science and ECS software development tools (custom software compilers, editors, linkers, pure coverage, softbench, etc.)
- Office automation tools (WABI/office-windows emulation for DOS application on Unix, zmail)
- Viewing tools (Adobe Acrobat, Ghostview, Netscape browsers) IDL

- IMSL; International Math & Statistics Library
- SQR Workbench; report writer
- SQS
- ClearCase; for configuration management
- Autosys and Autoxpert; for job scheduling and resource management
- DDTS; Distributed Defect Tracking Systems
- HP OpenView; for network management and hardware monitoring

Use of any other COTS software items which may be present on delivered platforms is at the DAAC M&O discretion and not subject to the delivery, test, configuration audit, maintenance and any other requirements which apply to the COTS which is part of the Testbed.

Tables 11.1.6-1 below classifies the majority of the COTS software into categories to simplify a description of the COTS mapped on to individual Testbed platforms at their respective DAAC sites. Sections 11.2 to 11.5 describe, in detail, the mapping of each COTS product along with the custom software that are installed and supported by the Testbed, on to the host platforms at GSFC, LaRC, EDC, and NSIDC respectively.

Table 11.1.6 -1. COTS Categories

COTS categories	COTS
Infrastructure	Operating system, DCE client, OODCE libraries (except IRIX), SNMP agent, sybase client (xalib, dblib, ctlib using dbtools.h++), tool.h++, dbtools.h++, Legato Networker Client, Motif, X11R5(SUN, HP), X11R6(SGI)
Security	TCPWrapper, Tripwire
SSI&T compilers	Platform specific F77, platform specific F90, NAG F90
SSI&T Tools	COTS: Ghostview, emacs, Adobe Acrobat, XEDIT, enscript, NCSA mosaic Custom: Prohibited Function Checker, PCF Checker, Binary File Diff., ASCII File Diff., HDF Comparison Tool, Profiling(SGI only)
GUI support tools	bx, graphpak, epak
Office tools	WABI/Office, Netscape browser, Zmail
Custom software compiler	Platform specific C, platform specific C++
Development	Platform specific development environment (e.g. Sun Sparcworks, HP Softbench, SGI Casevision)

11.1.4 CSCI to Executables

Following provides, for information only, the mapping information for the Testbed CSCI to their executables.

Subsystem	CSCI	Executables
CSS	DCI (Distributed Computing software CI)	DCE Directory, Security, Time servers cmi kftp kerberos client
MSS	MCI (Management Software CSCI)	HPOV
	MLCI (Management Logistics software CSCI)	DDTS Clearcase
CLS (note1)	WKBCH (Workbench software CSCI)	EosView
DPS	AITTL (Algorithm Integration & Test software CSCI)	SSIT Manager GUI SSIT tools FORCHECK SSIT GUI support tools IDL IMSL
DPS	PRONG (Processing software CSCI)	Ops QA monitor PGE Manager HDF-EOS SDP Toolkit Data preprocessing (originally DPREP) Processing support scripts (profiling) Autosys event processor Execution manager Data manager Resource manager Autosys remote agent PGE Registration GUI Autosys Operators console
PLS	PLANG (Planning CSCI)	Planning workbench Resource editor Production request editor Subscription manager

Note1: EOSView is hosted PLNHW and AITHW, which are part of PLS and DPS subsystems respectively.

11.2 Hardware Design and Configuration at GSFC

The hardware design diagrams and the disks partitioning at GSFC are provided in following documents:

- 420-TD-010-003 GSFC Pre-Release B Testbed HW/Network
- 420-TD-002-004 Pre-Release B Testbed HW diagram for GSFC
- 420-TD-037-002 Pre-Release B Testbed baseline for Science Processing RAID at GSFC
- 420-TD-054-001 Pre-Release B IMF RAID Configuration baseline for GSFC
- 420-TD-051-001 Pre-Release B IMF RAID Configuration baseline for GSFC
- 420-TD-066-001 Pre-Release B Testbed Staging RAID configuration baseline for GSFC

Note: Refer to he latest version of the above documents for post sell-off information.

11.2.1 Hardware Configuration at GSFC

Table 11.2.1-1 lists the hardware configuration of the Testbed at GSFC.

Table 11.2.1-1. Testbed Hardware at GSFC (1 of 2)

Subsystem	Function	Type	Make	Model	HWCI/Label	Qty.
DPS	Science Processor	Computer	SGI	Power Challenge	SPRHW-GSFC-1	1
	Tape drive	4 mm	SGI		p/o SPRHW-GSFC-1	1
	Science Processing Disk storage	RAID-64GB (16X4 GB)	SGI	C L Vault	SPRHW-GSFC-1B	1
	Science Processing Disk storage	RAID-84GB (21X4 GB)	SGI	C L Vault	SPRHW-GSFC-1C	1
	Science Processing Disk storage	RAID-84GB (21X4 GB)	SGI	C L Vault	SPRHW-GSFC-1D	1
	Virtual data server archive (IMF) disk storage	RAID-180GB (20X4 GB)	SGI	Rack Mounted	SPRHW-GSFC-1E	1
	Tape stacker	8 mm			SPRHW-GSFC- 1A, SPRHW-GSFC-1G	2
	Tape stacker	4 mm			SPRHW-GSFC-1F	1
	X -Terminal	Terminal	NCD	HMX-PRO	SPRHW-GSFC-2, SPRHW-GSFC-3	2

Table 11.2.1-1. Testbed Hardware at GSFC (2 of 2)

Subsystem	Function	Type	Make	Model	HWCI/Label	Qty.
	SSI&T WS (includes 4GB of internal storage)	Computer	Sun	Sparc 20/50	AITHW-GSFC-1	1
	SSI&T DBMS Server	Computer	Sun	Sparc 20/50	AITHW-GSFC-2	1
	SSI&T Printer	Printer	HP	Laser Jet	AITHW-GSFC-3	1
PLS	Planning Server	Computer	Sun	Sparc 20/71	PLNHW-GSFC-2	1
	Planning Disk storage	Storage Array-22GB	Sun	Sparc 20/712	PLNHW-GSFC-2A	1
	Planning WS	Computer	Sun	Sparc 20/50	PLNHW-GSFC-1	1
MSS	MSS Server	Computer	HP	J210/1	MSS-GSFC-4	1
	Shared Disk storage	RAID-26GB (13X2 GB)	HP		MSS-GSFC-4A	1
	MSS Printer	Printer	HP	Laser Jet	MSS-GSFC-2.2	1
	MSS WS	Computer	SUN	Sparc 20/50	MSS-GSFC-3	1
	CM Server	Computer	SUN	Sparc 20/71	MSS-GSFC-1.1	1
	Staging Disks for CM builds	RAID-75.6GB (18X4.2 GB)	SUN		MSS-GSFC-1.2	1
CSS	CSS Server	Computer	HP	J210/1	CSS-GSFC-1	1
Infrastructure	NFS Server	Computer	SGI	Challenge L	ACMHW-GSFC-2	1
	NFS disk storage	RAID-86 GB (20X4.3 GB)	SGI		ACMHW-GSFC-1A	1
ISS	FDDI switch/router			Fore systems	-	1
	FDDI concentrator			Syn Optics	-	8
	Ehternet Hub			Cabletron		1

Note: Only the raw storage capacity, in giga bytes, is specified for the disk storage. For the RAID, the first number in the parenthesis indicates the number of physical devices while the second number signifies the raw capacity of each device.

11.2.2 Software Mapping onto Hardware at GSFC

Table 11.2.2-1 provides host names and software mapping on to hardware platforms at GSFC DAAC.

Table 11.2.2-1. Hardware Software Mapping to Hardware Platforms at GSFC (1 of 2)

Testbed Host Platform at GSFC	ECS Custom Executables	COTS (Note 1)
SPRHW-GSFC-1 (Sci. Proc.) host name: sprg1sgi	HDF-EOS, SDP Toolkit, Data Preprocessing, Science software, Processing support (Profiling), PGE Manager	Infrastructure, Security, SSI&T Compilers, GUI Support Tools, Custom Software Compilers, CaseVision, ClearCase Client (point to MSS-CM server), NCSA HDF, IDL, IMSL, Pure Coverage, kftp, Kerberos Client, Legato Networker Server, AutoSys Remote Agent, DCE Toolkit
AITHW-GSFC-1 (AIT WS) host name: aitg1sun	SSIT Manager bGUI, PGE Registration GUI, QA Monitor, EosView, SDP Toolkit, SSI&T Tools (Custom)	Infrastructure, Security, SSI&T Compilers, SSI&T Tools (COTS), FORCHECK, GUI Support Tools, Office Tools, Custom Software Compilers, Development Environment, ClearCase Client (point to MSS-CM server), IDL, IMSL, kftp, Kerberos Client, sqr Wkbch, AutoSys, AutoXpert, AutoSys Remote Agent, DCE Toolkit
AITHW-GSFC-2 (AIT WS) host name: aitg2sun	SSIT Manager GUI, PGE Registration GUI, QA Monitor, EosView, SDP Toolkit, SSI&T Tools (Custom)	Infrastructure, Security, SSI&T Compilers, SSI&T Tools (COTS), DDTS (AIT copy), FORCHECK, Office Tools, Custom Software Compilers, Development Environment, ClearCase Client (point to MSS-CM server), IDL, IMSL, kftp, Kerberos Client, sqr Wkbch, AutoSys, AutoXpert, AutoSys Remote Agent
PLNHW-GSFC-1 (Planning WS) host name: plng1sun	Planning Workbench Application, Production Request Editor, Resource Editor, Subscription Manager, QA Monitor, EosView, SDP Toolkit	Infrastructure, Security, AutoSys, AutoXpert, AutoSys Remote Agent
PLNHW-GSFC-2 (Planning & Queuing Server) host name: plng2sun	Planning Workbench Application, Resource Editor, Production Request Editor, Subscription Manager, Data Manager, Execution Manager, Resource Manager, QA Monitor, EosView, SDP Toolkit	Infrastructure, Security, GUI Support Tools, Office Tools, Custom Software Compilers, Development Environment, ClearCase Client (point to krypton), Pure Coverage, DCE Time Server, Sybase SQL Server for AutoSys DB, net.h++, AutoSys, AutoXpert, AutoSys Event Processor, PDPS DB Server, AutoSys DB Server, Netscape Commerce Server, IDL

Table 11.2.2-1. Hardware Software Mapping to Hardware Platforms at GSFC (2 of 2)

Testbed Host Platform at GSFC	ECS Custom Executables	COTS (Note 1)
MSS-GSFC-1 (CM Server) host name: mssg1sun		Infrastructure, Security, ClearCase VOB Server, IQ Report Writer, License Server (flexlm)
MSS-GSFC-3 (MSS WS) mssg3sun	CMI	Infrastructure, Security, Office Tools, DDTS, ClearCase View Server
MSS-GSFC-4 (MSS Server) host name: mssg4hp		Infrastructure, Security, GUI Support Tools, Office Tools, Custom Compilers, Development Environment, ClearCase Client (point to krypton), HPOV (out-of-box), Pure Coverage, Perl5, DCE Time Server, DCE Toolkit,
CSS-GSFC-1 (CSS Server) host name: cssg1hp		Infrastructure, Security, DCE (Replicate Directory, Security and Time Servers), net.h++, DNS Slave for GSFC, NIS Slave
ACMHW-GSFC-2 (NFS Server) host name: acmg2sgi		Infrastructure, Security, NFS Server, DNS Master Mail Server for GSFC, NIS Master, License Server (netls)

Note 1: The COTS categories Infrastructure, Security, SSI&T compilers, SSI&T Tools, GUI support tools, Office tools, Custom software compiler, and Development Environment are defined in Table 11.1.4 -1.

Note 2: Refer the latest version of document 420-TD-006-XXX for post sell-off information on hardware-software mapping

11.3 Hardware Design and Configuration at LaRC

The hardware diagrams and the disk partitioning at LaRC is provided in following documents:

- 420-TD-011-004Pre-Release B Testbed Network Diagram for LaRC
- 420-TD-038-002Pre-Release B Testbed baseline for Science Processing RAID at LaRC
- 420-TD-055-001Pre-Release B Testbed IMF RAID Configuration baseline for LaRC
- 420-TD-043-002 Pre-Release B Testbed Planning Server Disk partitions for LaRC
- 420-TD-067-001Pre-Release B Testbed Staging RAID configuration baseline for LaRC

Note: Refer to the latest version of the above documents for post sell-off information.

11.3.1 Hardware Configuration at LaRC

Table 11.3.1-1 lists the hardware configuration of the Testbed at LaRC

Table 11.3.1-1. Testbed Hardware at LaRC (1 of 2)

Subsystem	Function	Type	Make	Model	HWCI/Label	Qty
DPS	Science Processor	Computer	SGI	Power Challenge	SPRHW-LaRC-6	1
	Tape drive	4 mm	SGI		p/o SPRHW-LaRC-6	1
	Science Processing Disk storage	RAID-68.8GB (16X4.3 GB)	SGI	C L Vault	SPRHW-LaRC-6A	1
	Science Processing Disk storage	RAID-77.4GB (18X4.3 GB)	SGI	C L Vault	SPRHW-LaRC-6B	1
	Science Processing Disk storage	RAID-68.8GB (16X 4.3 GB)	SGI	C L Vault	SPRHW-LaRC-5A	1
	Virtual data server archive (IMF) disk storage	RAID-86 GB (20X4.3 GB)	SGI	Rack Mounted	SPRHW-LaRC-6D	1
	Tape stacker	8 mm			SPRHW-LaRC- 5B	1
	X -Terminal	Terminal	NCD	HMX-PRO	SPRHW-LaRC-3, SPRHW-LaRC-8, SPRHW-LaRC-9 SPRHW-LaRC-10	4
	SSI&T WS (includes 4GB of internal storage)	Computer	Sun	Sparc 20/ 50	AITHW-LaRC-1	1
	SSI&T DBMS Server	Computer	Sun	Sparc 20/ 50	AITHW-LaRC-2	1
	SSI&T Printer	Printer	HP	Laser Jet	AITHW-LaRC-3	1
PLS	Planning Server	Computer	Sun	Sparc 20/ 71	PLNHW-LaRC-1	1
	Planning Disk storage	Storage Array-22GB	Sun	Sparc 20/ 712	PLNHW-LaRC-1A	1
	Planning WS	Computer	Sun	Sparc 20/ 50	PLNHW-LaRC-2	1

Table 11.3.1-1. Testbed Hardware at LaRC (2 of 2)

Subsystem	Function	Type	Make	Model	HWCI/Label	Qty
MSS	MSS Server	Computer	HP	J210/1	MSS-LaRC-4	1
	Shared Disk storage	RAID-26GB (13X2 GB)	HP		MSS-LaRC-4A	1
	MSS Printer	Printer	HP	Laser Jet	MSS-LaRC-2.2	1
	MSS WS	Computer	SUN	Sparc 20/ 50	MSS-LaRC-1.1	1
	CM Server	Computer	SUN		MSS-LaRC-1.1A	1
	Staging Disks for CM builds	RAID-75.6GB (18X4.2 GB)	SUN	Sparc 20/ 71	MSS-LaRC-3	1
			SUN		MSS-LaRC-3A	1
CSS	CSS Server	Computer				
			HP	J210/1	CSS-LaRC-1	1
Infrastructur e	NFS Server	Computer				
	NFS disk storage	RAID-86GB (20X4.3 GB)	SGI	Challenge L	ACMHW-LaRC-4	1
			SGI		ACMHW-LaRC-3A	1
ISS	FDDI switch/router					
	FDDI concentrator					

11.3.2 Software Mapping onto Hardware at LaRC

Table 11.3.2-1 provides host names and the software mapping to hardware platforms at LaRC DAAC.

Table 11.3.2-1. Hardware Software Mapping to Hardware Platforms at LaRC (1 of 2)

Testbed Host Platform at LARC	ECS Custom Executables	COTS (note 1)
SPRHW-LARC-1 (Sci. Proc.) host name: sprg6.sgi	HDF-EOS, SDP Toolkit, Data Preprocessing, Science software, Processing support (Profiling), PGE Manager	Infrastructure, Security, SSI&T Compilers, GUI Support Tools, Custom Software Compilers, CaseVision, ClearCase Client (point to MSS-CM server), NCSA HDF, IDL, IMSL, Pure Coverage, kftp, Kerberos Client, Legato Networker Server, AutoSys Remote Agent, DCE Toolkit
AITHW-LARC-1 (AIT WS) host name: aitl1sun	SSIT Manager GUI, PGE Registration GUI, QA Monitor, EosView, SDP Toolkit, SSI&T Tools (Custom)	Infrastructure, Security, SSI&T Compilers, SSI&T Tools (COTS), FORCHECK, GUI Support Tools, Office Tools, Custom Software Compilers, Development Environment, ClearCase Client (point to MSS-CM server), IDL, IMSL, kftp, Kerberos Client, sqr Wkbch, AutoSys, AutoXpert, AutoSys Remote Agent, DCE Toolkit
AITHW-LARC-2 (AIT WS) host name: aitl2sun	SSIT Manager GUI, PGE Registration GUI, QA Monitor, EosView, SDP Toolkit, SSI&T Tools (Custom)	Infrastructure, Security, SSI&T Compilers, SSI&T Tools (COTS), DDTS (AIT copy), FORCHECK, Office Tools, Custom Software Compilers, Development Environment, ClearCase Client (point to MSS-CM server), IDL, IMSL, kftp, Kerberos Client, sqr Wkbch, AutoSys, AutoXpert, AutoSys Remote Agent
PLNHW-LARC-2 (Planning WS) host name: plnl2sun	Planning Workbench Application, Production Request Editor, Resource Editor, Subscription Manager, QA Monitor, EosView, SDP Toolkit	Infrastructure, Security, AutoSys, AutoXpert, AutoSys Remote Agent
PLNHW-LARC-1 (Planning & Queuing Server) host name: plnl1sun	Planning Workbench Application, Resource Editor, Production Request Editor, Subscription Manager, Data Manager, Execution Manager, Resource Manager, QA Monitor, EosView, SDP Toolkit	Infrastructure, Security, GUI Support Tools, Office Tools, Custom Software Compilers, Development Environment, ClearCase Client (point to krypton), Pure Coverage, DCE Time Server, Sybase SQL Server for AutoSys DB, net.h++, AutoSys, AutoXpert, AutoSys Event Processor, PDPS DB Server, AutoSys DB Server, Netscape Commerce Server, IDL
MSS-LARC-3 (CM Server) host name: mssl3sun		Infrastructure, Security, ClearCase VOB Server, IQ Report Writer, License Server (flexlm)

Table 11.3.2-1. Hardware Software Mapping to Hardware Platforms at LaRC (2 of 2)

Testbed Host Platform at LARC	ECS Custom Executables	COTS (note 1)
MSS-LARC-3 (MSS WS) host name: mssg3sun	CMI	Infrastructure, Security, Office Tools, DDTS, ClearCase View Server
MSS-LARC-4 (MSS Server) host name: mssl4hp		Infrastructure, Security, GUI Support Tools, Office Tools, Custom Compilers, Development Environment, ClearCase Client (point to krypton), HPOV (out-of-box), Pure Coverage, Perl5, DCE Time Server, DCE Toolkit,
CSS-LARC-1 (CSS Server) host name: cssl1hp		Infrastructure, Security, DCE (Replicate Directory, Security and Time Servers), net.h++, DNS Slave for LARC, NIS Slave
ACMHW-LARC-4 (NFS Server) host name: acml4sgi		Infrastructure, Security, NFS Server, DNS Master Mail Server for LARC, NIS Master, License Server (netls)

Notes:

1. The COTS categories Infrastructure, Security, SSI&T compilers, SSI&T Tools, GUI support tools, Office tools, Custom software compiler, and Development Environment are defined in table 11.1.4 -1.
2. For updated/post sell-off information on hardware-software mapping at LaRC, refer the latest version of document 420-TD-007-XXX.

11.4 Hardware Design and Configuration at EDC

The hardware diagrams and the disk partitioning at EDC is provided in following documents:

- 420-TD-050-001 Pre-Release B Testbed Hardware Diagram for EDC
- 420-TD-056-001 Pre-Release B Testbed Science Processing RAID Configuration for EDC
- 420-TD-060-001 Pre-Release B Testbed NFS RAID configuration baseline for EDC
- 420-TD-058-001 Pre-Release B Testbed Staging RAID configuration baseline for EDC
- 420-TD-064-001 Pre-Release B Testbed MSS/CSS RAID Configuration baseline for EDC
- 420-TD-062-001 Pre-Release B Testbed Planning/Queuing Server RAID for EDC
- 420-TD-052-001 Pre-Release B Testbed IMF RAID Configuration baseline for EDC

Note: Refer to the latest version of the above documents for post sell-off information.

11.4.1 Hardware Configuration at EDC

Table 11.4.1-1 lists the hardware configuration of the Testbed at EDC DAAC.

Table 11.4.1-1. Testbed Hardware at EDC (1 of 2)

Subsystem	Function	Type	Make	Model	HWCI/Label	Qty
DPS	Science Processor	Computer	SGI	Power Challenge	SPRHW-EDC-1	1
	Tape drive	4 mm	SGI		p/o SPRHW-EDC-1	1
	Science Processing Disks storage -144GB storage for Science Processing - 144GB storage for Virtual data server (IMF)	RAID-288GB	SGI	C L Vault	SPRHW-EDC-1B, 1C,1D,1E	4
	Tape stacker	8 mm			SPRHW-EDC- 1A	1
	X -Terminal	Terminal	NCD	HMX-PRO	SPRHW-EDC-2, SPRHW-EDC-3	2
	SSI&T WS	Computer	Sun	Sparc 20/50	AITHW-EDC-1	1
	SSI&T DBMS Server	Computer	Sun	Sparc 20/50	AITHW-EDC-3	1
	SSI&T Disk storage	4 GB	Sun	Unipack	AITHW-EDC3A	
	SSI&T Printer	Printer	HP	Laser Jet	AITHW-EDC-2	1
PLS	Planning & Queuing Server	Computer	Sun	Sparc 20/71	PLNHW-EDC-2	1
	Planning Disk storage	22GB	Sun	Sparc 20/ 712	PLNHW-EDC-2A	1
	Planning WS	Computer	Sun	Sparc 20/50	PLNHW-EDC-1	1
MSS	MSS Server	Computer	HP	J210/1	MSS-EDC-2	1
	Shared Disk Storage	RAID-10GB	HP		MSS-EDC-2A	1
	MSS Printer	Printer	HP	Laser Jet	MSS-EDC-3	1
	MSS WS	Computer	SUN	Sparc 20/ 712	MSS-EDC-4	1
	CM Server	Computer	SUN	Sparc 20/50	MSS-EDC-1	1
	Staging Disks storage for CM builds	RAID-75.6GB (18X4.2 GB)	SUN		MSS-EDC-1A	1
CSS	CSS Server	Computer	HP	J210/1	CSS-EDC-1	1

Table 11.4.1-1. Testbed Hardware at EDC (2 of 2)

Subsystem	Function	Type	Make	Model	HWCI/Label	Qty
Infrastructure	NFS Server	Computer	SGI	Challenge L	ACMHW-EDC-4	1
	NFS disk	RAID-50GB	SGI		ACMHW-EDC-3A	1
ISS	FDDI switch/router (shared between the Testbed and Rel. B)					
	FDDI concentrator					

Note: Not included in the above table are:

- Support workstation hardware at EDC
- Aster-LUT Sybase server hardware

11.4.2 Software Mapping onto Hardware at EDC

Table 11.4.2-1 provides host names and the COTS mapping to hardware platforms at EDC DAAC.

Table 11.4.2-1 Hardware Software Mapping to Hardware Platforms at EDC (1 of 2)

Testbed Host Platform at EDC	ECS Custom Executables	COTS (note 1)
SPRHW-EDC-1 (Sci. Proc.) spre1sgi	HDF-EOS, SDP Toolkit, Data Preprocessing, Science software, Processing support (Profiling), PGE Manager	Infrastructure, Security, SSI&T Compilers, GUI Support Tools, Custom Software Compilers, CaseVision, ClearCase Client (point to MSS-CM server), NCSA HDF, IDL, IMSL, Pure Coverage, kftp, Kerberos Client, Legato Networker Server, AutoSys Remote Agent, DCE Toolkit
AITHW-EDC-1 (AIT WS) aite1sun	SSIT Manager GUI, PGE Registration GUI, QA Monitor, EosView, SDP Toolkit, SSI&T Tools (Custom)	Infrastructure, Security, SSI&T Compilers, SSI&T Tools (COTS), FORCHECK, GUI Support Tools, Office Tools, Custom Software Compilers, Development Environment, ClearCase Client (point to MSS-CM server), IDL, IMSL, kftp, Kerberos Client, sqr Wkbch, AutoSys, AutoXpert, AutoSys Remote Agent, DCE Toolkit
AITHW-EDC-3 (AIT WS) aite3sun	SSIT Manager GUI, PGE Registration GUI, QA Monitor, EosView, SDP Toolkit, SSI&T Tools (Custom)	Infrastructure, Security, SSI&T Compilers, SSI&T Tools (COTS), DDTS (AIT copy), FORCHECK, Office Tools, Custom Software Compilers, Development Environment, ClearCase Client (point to MSS-CM server), IDL, IMSL, kftp, Kerberos Client, sqr Wkbch, AutoSys, AutoXpert, AutoSys Remote Agent

Table 11.4.2-1 Hardware Software Mapping to Hardware Platforms at EDC (2 of 2)

Testbed Host Platform at EDC	ECS Custom Executables	COTS (note 1)
PLNHW-EDC-1 (Planning WS) plne1sun	Planning Workbench Application, Production Request Editor, Resource Editor, Subscription Manager, QA Monitor, EosView, SDP Toolkit	Infrastructure, Security, AutoSys, AutoXpert, AutoSys Remote Agent
PLNHW-EDC-2 (Planning & Queuing Server) plne2sun	Planning Workbench Application, Resource Editor, Production Request Editor, Subscription Manager, Data Manager, Execution Manager, Resource Manager, QA Monitor, EosView, SDP Toolkit	Infrastructure, Security, GUI Support Tools, Office Tools, Custom Software Compilers, Development Environment, ClearCase Client (point to krypton), Pure Coverage, DCE Time Server, Sybase SQL Server for AutoSys DB, net.h++, AutoSys, AutoXpert, AutoSys Event Processor, PDPS DB Server, AutoSys DB Server, Netscape Commerce Server, IDL
MSS-EDC-~~4~~1 (CM Server) msse~~4~~1sun		Infrastructure, Security, ClearCase VOB Server, IQ Report Writer, License Server (flexlm)
MSS-EDC-~~3~~ 4 (MSS WS) mss~~g3~~e4sun	CMI	Infrastructure, Security, Office Tools, DDTS, ClearCase View Server
MSS-EDC-~~4~~ 2 (MSS Server) msse~~4~~2hp		Infrastructure, Security, GUI Support Tools, Office Tools, Custom Compilers, Development Environment, ClearCase Client (point to krypton), HPOV (out-of-box), Pure Coverage, Perl5, DCE Toolkit, DCE Time Server
CSS-EDC-1 (CSS Server) csse1hp		Infrastructure, Security, DCE (Replicate Directory, Security and Time Servers), net.h++, DNS Slave for LARC, NIS Slave
ACMHW-EDC-3 (NFS Server) acme3sgi		Infrastructure, Security, NFS Server, DNS Master Mail Server for LARC, NIS Master, License Server (netls)

Note:

1. The COTS categories Infrastructure, Security, SSI&T compilers, SSI&T Tools, GUI support tools, Office tools, Custom software compiler, and Development Environment are defined in table 11.1.4 -1.
2. For updated/post sell-off information on hardware-software mapping at EDC, refer the latest version of document 420-TD-046-XXX.

11.5 Hardware Design and Configuration at NSIDC

The hardware diagrams and the disk partitioning at NSIDC is provided in following documents:

- 420-TD-049-001 Pre-Release B Testbed Network Diagram for NSIDC
- 420-TD-051-001 Pre-Release B Testbed HW Diagram for NSIDC
- 420-TD-047-002 Update NSIDC Pre-Release B Hardware-Software mapping baseline
- 420-TD-047-001 Pre-Release B Testbed HW/SW mapping baseline for NSIDC
- 420-TD-061-001 Pre-Release B Testbed NFS RAID configuration baseline for NSIDC
- 420-TD-059-001 Pre-Release B Testbed Staging RAID configuration baseline for NSIDC
- 420-TD-053-001 Pre-Release B IMF RAID Configuration baseline for NSIDC
- 420-TD-063-001 Pre-Release B Testbed Planning/Queuing Server RAID for NSIDC
- 420-TD-065-001Pre-Release B Testbed MSS/CSS RAID Configuration baseline for NSIDC

Note: refer the latest version of the above documents for post sell-off information

11.5.1 Hardware Configuration at NSIDC

Table 11.5.1-1 provides the hardware configuration of the Testbed at NSIDC.

Table 11.5.1-1. Testbed Hardware at NSIDC (1 of 2)

Subsystem	Function	Type	Make	Model	HWCI/Label	Qty
DPS	Science Processor	Computer	SGI	Indigo Impact	SPRHW-NSIDC-1	1
	File Server	Computer	SGI	Challenge S	SPRHW-NSIDC-2	1
	Science Processing Disk storage	RAID-32GB	SGI	C L Vault	SPRHW-NSIDC-2B	1
	Virtual data server archive (IMF) storage	RAID-90GB	SGI		SPRHW-GSFC-2D	1
	X Terminal	Terminal	NCD	HMX-PRO	SPRHW-NSIDC-4	1
	SSI&T WS	Computer	Sun	Sparc 20/50	AITHW-NSIDC-1	1
	SSI&T DBMS Server	Computer	Sun	Sparc 20/712	AITHW-NSIDC-2	1
	SSI&T Printer	Printer	HP	Laser Jet	AITHW-NSIDC-3	1
PLS	Planning & Queuing Server	Computer	Sun	Sparc 20/71	PLNHW-NSIDC-1	1
	Planning Disk storage	RAID-18GB	Sun	Sparc 20/712	PLNHW-NSIDC-1A	1
	Planning WS	Computer	Sun	Sparc 20/50	PLNHW-NSIDC-2	1
MSS	MSS Server	Computer	HP	J210	MSS-NSIDC-1	1

Table 11.5.1-1. Testbed Hardware at NSIDC (2 of 2)

Subsystem	Function	Type	Make	Model	HWCI/Label	Qty
	Shared RAID	RAID-10GB	HP		MSS-NSIDC-1A	1
	MSS WS	Computer	SUN	Sparc 20/50	MSS-NSIDC-3	1
	CM Server	Computer	SUN	Sparc 20/50	MSS-NSIDC-1	1
	Staging Disks for CM builds	RAID-50GB	SUN		MSS-NSIDC-1A	1
CSS	CSS Server	Computer	HP	J210	CSS-NSIDC-1	1
Infrastructure	NFS Server	Computer	SGI	Challenge L	ACMHW-NSIDC-1	1
	NFS disk storage	RAID-75.6GB (18X4.2 GB)	SGI		SPRHW-NSIDC-2C	1
	Tape Stacker	8 mm			SPRHW-NSIDC-3	1
ISS	FDDI switch/router					
	FDDI concentrator					

11.5.2 Software Mapping onto Hardware at NSIDC

Table 11.5.2-1 provides host names and the COTS mapping to hardware platforms at NSIDC DAAC.

Table 11.5.2-1. Hardware Software Mapping to Hardware Platforms at NSIDC (1 of 2)

Testbed Host Platform at NSIDC	ECS Custom Executables	COTS
SPRHW-NSIDC-1 (Sci. Proc.) sprn1sgi	HDF-EOS, SDP Toolkit, Data Preprocessing, Science software, Processing support (Profiling), PGE management	Infrastructure, Security, SSI&T Compilers, GUI Support Tools, Custom Software Compilers, CaseVision, ClearCase Client (point to MSS-CM server), NCSA HDF, IDL, IMSL, Pure Coverage, kftp, Kerberos Client, Legato Networker Server, AutoSys Remote Agent, DCE Toolkit
SPRHW-NSIDC-2 (File server) sprn2sgi		Infrastructure, security
AITHW-NSIDC-1 (AIT WS) aitn1sun	SSIT Manager GUI, PGE Registration GUI, QA Monitor, EosView, SDP Toolkit, SSI&T Tools (Custom)	Infrastructure, Security, SSI&T Compilers, SSI&T Tools (COTS), FORCHECK, GUI Support Tools, Office Tools, Custom Software Compilers, Development Environment, ClearCase Client (point to MSS-CM server), IDL, IMSL, kftp, Kerberos Client, sqr Wkbch, AutoSys, AutoXpert, AutoSys Remote Agent, DCE Toolkit
AITHW-NSIDC-2 (AIT WS) aitn2sun	SSIT Manager GUI, PGE Registration GUI, QA Monitor, EosView, SDP Toolkit, SSI&T Tools (Custom)	Infrastructure, Security, SSI&T Compilers, SSI&T Tools (COTS), DDTS (AIT copy), FORCHECK, Office Tools, Custom Software Compilers, Development Environment, ClearCase Client (point to MSS-CM server), IDL, IMSL, kftp, Kerberos Client, sqr Wkbch, AutoSys, AutoXpert, AutoSys Remote Agent
PLNHW-NSIDC-2 (Planning WS) plnn2sun	Planning Workbench Application, Production Request Editor, Resource Editor, Subscription Manager, QA Monitor, EosView, SDP Toolkit	Infrastructure, Security, AutoSys, AutoXpert, AutoSys Remote Agent
PLNHW-NSIDC-1 (Planning & Queuing Server) plnn1sun	Planning Workbench Application, Resource Editor, Production Request Editor, Subscription Manager, Data Manager, Execution Manager, Resource Manager, QA Monitor, EosView, SDP Toolkit	Infrastructure, Security, GUI Support Tools, Office Tools, Custom Software Compilers, Development Environment, ClearCase Client (point to krypton), Pure Coverage, DCE Time Server, Sybase SQL Server for AutoSys DB, net.h++, AutoSys, AutoXpert, AutoSys Event Processor, PDPS DB Server, AutoSys DB Server, Netscape Commerce Server, IDL, DCE Toolkit
MSS-NSIDC-1 (CM Server) mssn1sun		Infrastructure, Security, ClearCase VOB Server, IQ Report Writer, License Server (flexlm)
MSS-NSIDC-3 (MSS WS) mssn3sun	CMI	Infrastructure, Security, Office Tools, DDTS, ClearCase View Server

Table 11.5.2-1. Hardware Software Mapping to Hardware Platforms at NSIDC (2 of 2)

Testbed Host Platform at NSIDC	ECS Custom Executables	COTS
MSS-NSIDC-4 (MSS Server) mssn4hp		Infrastructure, Security, GUI Support Tools, Office Tools, Custom Compilers, Development Environment, ClearCase Client (point to krypton), HPOV (out-of-box), Pure Coverage, Perl5, DCE Toolkit, DCE Time Server
CSS-NSIDC-1 (CSS Server) cssn1hp		Infrastructure, Security, DCE (Replicate Directory, Security and Time Servers), net.h++, DNS Slave for LARC, NIS Slave
ACMHW-NSIDC-1 (NFS Server) acmn1sgi		Infrastructure, Security, NFS Server, DNS Master Mail Server for LARC, NIS Master, License Server (netls)

Notes:

1. The COTS categories Infrastructure, Security, SSI&T compilers, SSI&T Tools, GUI support tools, Office tools, Custom software compiler, and Development Environment are defined in table 11.1.4 -1.
2. For updated/post sell-off information on hardware-software mapping at NSIDC, refer the latest version of document 420-TD-047-XXX.

Abbreviations and Acronyms

ACL	Access Control List
ACMHW	Access Control Management Hardware
AI&T	Algorithm Integration & Test
AIT	Algorithm Integration & Test
AITHW	Algorithm Integration & Test Hardware CSCI
AITTL	Algorithm Integration & Test CSCI
AM-1	EOS Ascending Mission (morning crossing) number 1
ANSI	American National Standards Institute
API	Application program (or programming) interface
ARP	Address Resolution Protocol
ASTER	Advanced Spaceborne Thermal and Reflection Radiometer
CDR	Critical Design Review
CERES	Clouds and Earth's Radiant Energy System
CI	Configuration item
CLS	Client Subsystem
CM	Configuration management
COTS	Commercial off the shelf (hardware or software)
CPU	Central processing unit
CSC	Computer software component
CSCI	Computer software configuration item
CSS	Communication Subsystem
DAAC	Distributed Active Archive Center
DAP	Delivered algorithm package
DAS	Dual attached stations
DBMS	Database management system
DCE	Distributed computing environment (OSF)
DCHI	Distributed Computing Hardware CI
DCI	Distributed Computing Software CI
DDTS	Distributed Defect Tracking System
DLL	Dynamically linked library
DNS	Directory Name Service
DPR	Data processing request

EBnet	EOSDIS Backbone Network
ECS	EOSDIS Core System
EDC	EROS Data Center
E-Mail	Electronic mail
EOS	Earth Observing System
EOSDIS	Earth Observing System Data and Information System
ESDIS	Earth Science Data & Information System
ESDT	Earth science data type
FDDI	Fiber distributed data interface
Ftp	File transfer protocol
GSFC	Goddard Space Flight Center
GUI	Graphic user interface
HAIS	Hughes Applied Information Systems (ECS)
HCI	Hardware configuration item
HDF	Hierarchical data format
HP	Hewlett Packard
Http	Hyper text transfer protocol
HW	Hardware
HWCI	Hardware configuration item
I/F	Interface
I&T	Integration & Test
I/O	Input/output
ICMP	Internet Control Message Protocol
ID	Identification
IDL	Interface definition language
IMF	Integrated Metastorage Factory
IP	Internet protocol
IR-1	Interim Release 1
IsoLAN	Isolation Local Area Network
ISS	Internetworking Subsystem of CSMS
LAN	Local area network
LaRC	Langley Research Center
M&O	Maintenance and Operations
MCF	Metadata configuration file
MCI	Management Software CSCI
MHCI	Management Hardware CI

MISR	Multi-Angle Imaging SpectroRadiometer
MLCI	Management Logistics Software CSCI
MODIS	Moderate-Resolution Imaging Spectroradiometer
MOPITT	Measurements of Pollution in the Troposphere
MSS	Systems Management Subsystem
NCR	Non-conformance report
NCSA	National Center for Supercomputing Applications
NFS	Network File System
NSI	NASA Science Internet
NSIDC	National Snow & Ice Data Center
ODL	Object design language
OEM	Original equiptment manufacturer
OODCE	Object-oriented DCE
OSF	Open Software Foundation
OSI	Open systems interconnection
OTS	Off the shelf
PC	Personnal computer
PCF	Prohibited function checker
PDPS	Planning & Data Processing System
PGE	Product generation executable
PLANG	Planning Subsystem
PLNHW	Production Planning Hardware CSCI
PR	Production request
PRONG	Data Processing Subsystem
Q/A	Quality Assurance
RAID	Redundant arrays of inexpensive disks
RAM	Random access memory
RDBMS	Relational database management system
RFC	Request for comments
RIP	Routing Information Protocol
RPC	Remote procedure call
SAGE	Stratospheric Aerosol and Gas Experiment
SAS	Single attached station
SCF	Science Computing Facility
SDP	Science Data Processing
SDPTK	Science Data Processing Toolkit

SGI	Silicon Graphics
SLED	Single large expensive disk
SMC	System Monitoring and Control
SNMP	Simple Network
SPRHW	Science Processing Hardware CI
SQR	Sybase Query Reporter
SQS	Spacial query server
SSI&T	Science Software Integration & Test
SW	Software
TCP/IP	Transmission Control Protocol/Internet Protocol
UDP	User Datagram Protocol
UR	Universal reference
UTC	Universal time coordinated
VDD	Version Description Document